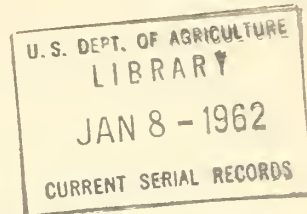


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# JAPAN'S

## Oilseed and Fats and Oils Industry

October/1961

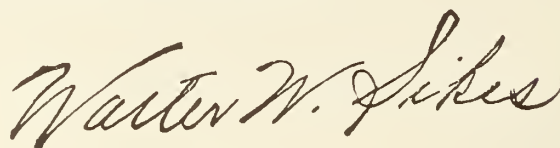
Foreign Agricultural Service,  
U. S. DEPARTMENT OF AGRICULTURE,

FAS-M-120)

## FOREWORD

Japan is now the most important export market for our soybean crop. Its imports of this valuable oilseed from U.S. farms equals the production of nearly 1,700,000 acres of land, providing added cash income for over 600,000 U.S. commercial soybean farmers. Japan is also an important market for our safflowerseed and tallow and grease. Last year it took nearly 100,000 tons of safflowerseed from our western farms and over 100,000 tons of tallow and grease that were formerly in great demand by our ever-changing soap industry.

In this report--the result of an on-the-spot study by the author--the dynamic trends in the expanding fats and oils economy of Japan are outlined and analyzed.

A handwritten signature in cursive script, reading "Walter W. Sikes". The signature is written in dark ink and is positioned above the printed name and title.

Walter W. Sikes, Director  
Fats and Oils Division

## ACKNOWLEDGMENT

The author wishes to thank the Japanese Oil and Fat Manufacturers Association for the help given to him by its members during his visit to their crushing mills in November and December 1960. Also, he wishes to express his appreciation to Mr. Baba of the Oils and Fats Section of the Japanese Ministry of Agriculture and Forestry for providing information and making possible the visit to the oilseed farming areas of Japan. Mr. Shizuka Hayashi, Managing Director, Japanese American Soybean Institute, gave most valuable advice and help in obtaining information, as did Japanese Government and Prefecture Departments of Agriculture employees--particularly in Hokkaido and Fukuoka--members of the Japanese farm cooperatives associations, processors, traders, importers, and other members of the soybean food-using industries and their association leaders. Most helpful too were the suggestions of David R. Farlow of the American Soybean Association.

Also, the author wishes to express his appreciation for the help given him by the U.S. Agricultural Attaché, C. M. Elkinton, and his staff in Tokyo, who were most helpful in making appointments and obtaining much of the data and pertinent information.

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# JAPAN'S OILSEED AND FATS AND OILS INDUSTRY

By Calvin C. Spilsbury  
Fats and Oils Division

## INTRODUCTION

Japan's phenomenal economic recovery in the postwar period has brought a steady increase in the consumption of fats and oils. Per capita consumption of edible fats and oils, while still very low compared with Western standards, has more than tripled since the prewar period. As late as 1951, it was less than 4 pounds; in 1960, it was around 10.2. Furthermore, it is expected to more than double in the next 10 years, as the Japanese people are able to afford improved nutritional standards.

With limited arable land areas available for growing oilseeds, Japan must obtain the bulk of its much-needed fats and oils and oilseed supplies from marine or overseas sources. Thus, it is one of the world's leading importers of these commodities. In pre-World War II years, Manchurian soybeans and Korean fish oils furnished approximately 40 percent of Japan's imported fats and oils supply. However, in the postwar years, sources of supply have changed, and the bulk of the imports now comes from the United States, Canada, Thailand, and other new areas of supply. Japan is the largest single buyer of U.S. soybeans, as well as a leading importer of U.S. tallow and greases. In recent years, it also has been importing significant quantities of safflowerseed and cottonseed oil from the United States.

## SUMMARY

The production of domestic fats and oils, oilseeds, and oil-bearing materials in Japan will increase only slowly in the future; world prices must rise materially before a significant expansion would be profitable. Though more butter and animal fats will become available from an expanding livestock industry, vegetable oilseeds will continue to find more competition from alternative crops. Furthermore, the Japanese Government's liberalizing all oilseeds will provide the country with additional lower priced oilseeds, fats and oils, and protein foods and feed to meet the upward demand for these products.

Japanese consumption of fats and oils will increase by 5 to 15 percent each year for some time. Edible fats and oils consumption is growing faster than industrial, and consumption of oilseed-protein meal in feed is growing faster than that of soybeans and soybean cake and meal in food.

The demand for oilseed proteins for food, feed, and fertilizer is increasing--that for high-protein feed, more rapidly than for vegetable oils, thus establishing another potential increase in the demand for soybeans and other low-oil-content and high-protein oilseeds.

As a result, soybeans are Japan's best buy, and the annual increase in the imports of soybeans and other oilseeds is expected to continue at the rate of over 10 to 15 percent during the next several years. Japanese crushers are better satisfied with the quality of soybeans and safflowerseed now being received from the United States and feel that the price stability of U.S. oilseeds in the past couple of years has provided them with further protection in marketing their products.

Freeing of soybeans from import controls could bring about a sudden increase in imports as high as 50 to 100 percent, but imports of other oilseeds possibly could be reduced somewhat by such a surge. Generally, world prices of oilseeds fluctuate widely, and recent upward price movements in soybeans may have some influence on the increased imports of other oilseeds into Japan.



Japan's fats and oils crushing industry is being reconstructed and modernized not only to handle an additional volume of low-oil-content oilseeds, such as soybeans, but also to bring increased efficiency into oilseed extraction and to lower production costs. This new technology will provide a higher standard of living to the Japanese people in the form of improved-quality lower priced food and fats and oils. This will enable low-income families to increase total consumption of both essential fats and oils and of high-protein food products that are processed from soybean cake and meal. Soybean foods, particularly miso (soybean paste), tofu (soybean curd), shoyu (soybean sauce), and natto (fermented soybeans), are an important part of the Japanese diet.

At the present time, Japan's production of oilseeds and oil-bearing materials appears to have reached a maximum, but imports of U.S. soybeans and safflower and other oilseeds are making major contributions toward providing lower priced fats and oils for the required supplies. Japan has adequate dollar exchange, and wants to buy more oilseeds and fats and oils. The availability of low-priced animal fats from the United States for substitution in the soap industry has enabled Japan to increase domestic supplies of edible oils by upgrading oils formerly used in soap and by refining rice-bran oil and rapeseed oil for use in edible oil products.

The production and consumption of margarine and shortening are growing and are expected to continue to increase, but the demand for fluid vegetable oils will continue to dominate the consumer market.

The use of imported animal fats by the soap industry is expected to move upward, but the demand and production of synthetic detergents will continue to increase much faster.

The amount of fish and whale oil now consumed for edible use may decrease as export markets expand. This will provide added demands for vegetable oils.

American safflowerseed is finding a large market in Japan, and imports of Canadian rapeseed are increasing.

The development of the fats and oils industry in Japan into an efficient modern industry is creating a large dependable market for U.S. oilseeds and fats and oils. This industry has the working capital, processing facilities, and storage to crush and handle any type of oilseed in a large volume when the economic situation changes. For example, the Japanese crushing industry now has the capacity to handle an additional 1 million tons of soybeans each year. Japan in 1960 imported 1.1 million tons of soybeans.

## THE FATS AND OILS INDUSTRY

The Japanese fats and oils industry, producing both edible and industrial products, is in transition. Most large vegetable-oil and animal-fat processors and oilseed crushers are just completing plant expansion and modernization or are in the construction or planning stage. Under construction are processing units for oilseeds, facilities for processing vegetable oil and marine and animal fats and oils into soap, margarine, and shortening, and, in some cases, entire new plants. Storage facilities to handle bulk materials, fats and oils, and oilseeds, very much lacking in the past, are being built rapidly. When these are finished, in the next 10 to 15 years, the industry will be modern, efficient, and large scale.

Such steady modernization in the fats and oils industry took place after the war in the United States, when there was a steady decline in the number of small processing plants that provided local areas with fats and oils products. This trend is occurring in Japan also, as the larger plants continue to provide more efficient services at lower cost to consumers. At present, small local vegetable oil, margarine, soap, and paint processing plants still operate profitably as a result of the wide margins available, and provide special services to local consumers. Many can be expected to continue to operate effectively in the future.



## SOYBEAN IMPORTS at Japanese Port



Lighters move soybeans from oceangoing ship to port.



Electrically powered lift moves beans from lighter.

Since Japan imports about three-fourths of the soybeans used in its oilseed-crushing and refining industry, port facilities for handling the beans are an important cost factor for the industry.

Truckload of bagged soybeans ready to leave the dock for storage at oil crushing mill.



Sometimes beans are lifted by power shovels from lighters, and then they are moved by portable belts to dock storage.



The Japanese fats and oils industry today markets improved-quality branded products, and appears to be in a position to finance larger inventories of oilseeds and fats and oils and such marketable products as refined vegetable and salad oils, soaps, margarine, and meal and meal products. The industry is doing much to control the loss (due to fluctuations and variations in seasonal prices and consumer demand) that is characteristic of this industry. Over the long run the modernization of the industry will reduce consumer prices and increase the demand for fats and oils in Japan.

The large demand for edible fats and oils that has developed in recent years has exceeded the demand for industrial fats and oils, and has resulted in a large expansion in the edible fats and oils industry. In the prewar period, edible fats and oils made up less than 30 percent of total consumption, but at the present time, they account for over 55 percent.

Integration in the fats and oils industry is found in several instances in Japan. The large oilseed crushers also operate refineries for deodorizing and winterizing, soap plants, and feed and flour and other factories. These companies also market their own brands of finished products direct to wholesalers and retailers. Most margarine and shortening processors are also integrated with the refining and hydrogenating of animal and marine fats and oils.

### Total Supply of Fats and Oils

Japan's supply of oilseeds and oil-bearing materials, including rice bran, for crushing and food is expected to continue upward in 1961 and probably will total around 3.3 million metric tons, an increase of 93,000 tons over 1960. Soybean imports were liberalized July 1 and are expected to continue at a high rate during the second half of 1961.

Domestic production of oilseeds accounted for slightly less than half of total availability. Just over one-fourth of the soybeans are produced in Japan. Soybeans make up nearly half of the oilseed supplies. Domestic rice bran, which has become an important source of vegetable oil in recent years, accounts for about one-fifth of total supplies. Next to soybeans, rapeseed, mustardseed, and cottonseed are the most important sources of edible vegetable oil, and flaxseed is the major source of industrial oils, followed by rice bran and castorbeans. Safflowerseed crushings have increased in recent years in Japan, mainly for edible oil. (In the United States the oil is used mostly for its drying or paint-making qualities.)

TABLE 1.--Supply: Oilseeds and oil-bearing materials, Japan, 1957-61

Oilseed	1957	1958	1959	1960	1961 forecast
Edible:	Metric tons	Metric tons	Metric tons	Metric tons	Metric tons
Soybeans.....	1,317,629	1,341,421	1,461,910	1,582,713	1,658,383
Rapeseed and mustardseed.....	331,962	298,968	310,088	310,661	323,462
Cottonseed.....	51,793	86,370	124,478	94,399	110,487
Safflowerseed.....	27,811	29,746	69,483	99,828	68,471
Peanuts (shelled).....	61,701	66,462	70,850	94,211	94,930
Sesameseed.....	19,348	22,175	32,601	36,048	33,540
Kapokseed.....	25,499	30,616	35,731	37,541	35,848
Other <sup>1</sup> .....	9,451	7,463	17,578	53,579	47,907
Total.....	1,845,194	1,883,221	2,122,719	2,308,980	2,373,028
Palm:					
Copra.....	49,174	49,738	56,799	88,972	82,166
Palm kernels.....	30,133	34,381	35,941	32,531	39,940
Total.....	79,307	84,119	92,740	121,503	122,106
Industrial:					
Rice bran.....	547,562	574,594	603,533	630,817	646,101
Flaxseed.....	93,945	56,564	95,663	90,433	102,337
Castorbeans.....	26,594	23,021	27,941	27,897	30,366
Perillaseed.....	233	300	45	859	100
Tung nuts <sup>2</sup> .....	550	550	600	600	600
Total.....	668,884	655,029	727,782	750,606	779,504
Total excluding rice bran....	121,322	80,435	124,249	119,789	133,403
Total oilseed & material supplies.....	2,593,385	2,622,369	2,943,241	3,181,089	3,274,638
Total excluding rice bran....	2,045,823	2,047,775	2,339,708	2,550,272	2,628,537

<sup>1</sup> Includes hempseed and sunflowerseed.

<sup>2</sup> Domestic production.

Compiled from official and other sources.

TABLE 2.--Crushings and production: Oilseeds, vegetable oil, and cake and meal, Japan, 1959 and 1960<sup>1</sup>

Oilseed	Volume crushed		Oil extracted				Cake and meal produced			
	1960	1959	Metric tons	1960	1959	Percent	Metric tons	1960	1959	Percent
	Metric tons	Metric tons	Metric tons	Percent	Metric tons	Percent	Metric tons	Percent	Metric tons	Percent
<b>Edible:</b>										
Soybeans, domestic.....	3,797	2,687	558	14.7	399	14.8	3,080	81.1	2,190	81.5
Soybeans, imported.....	914,738	840,433	162,573	17.8	147,173	17.5	698,523	76.4	644,068	76.6
Rapeseed, domestic.....	171,389	219,003	65,347	38.1	86,297	39.4	95,854	55.9	129,287	59.0
Rapeseed, imported.....	52,036	21,942	19,470	37.4	8,589	39.1	29,121	56.0	12,292	56.0
Cottonseed, imported.....	83,818	100,755	16,254	19.4	19,170	19.0	42,676	50.9	50,640	50.3
Kapokseed, imported.....	33,175	30,665	7,138	21.5	6,876	22.4	24,717	74.5	23,063	75.2
Sesame, imported.....	19,045	9,838	8,804	46.2	4,305	43.8	9,265	48.6	4,792	48.7
Peanuts, imported.....	---	172	---	--	58	33.7	---	--	112	65.1
Sunflowerseed, imported.....	22,964	1,757	2 9,113	39.7	506	28.8	2 14,213	61.9	837	47.6
Mustard, imported.....	---	492	---	--	181	36.8	---	--	296	60.2
Other, domestic.....	4 11,057	2,612	1,136	9.7	301	11.5	8,242	70.5	1,866	71.4
Other, imported.....	13,721	2,532	5,404	39.4	970	38.3	7,997	58.3	1,420	56.1
Total.....	1,325,740	1,232,888	295,797	----	274,825	----	933,688	----	870,863	----
<b>Palm:</b>										
Copra, imported.....	74,239	48,125	47,195	63.6	34,219	71.1	24,562	33.1	2 17,842	37.1
Palm kernels, imported.....	27,292	31,535	13,252	48.6	17,797	56.4	12,958	47.5	2 15,727	49.9
Total.....	101,531	79,660	60,447	----	52,016	----	37,520	----	33,569	----
<b>Industrial:</b>										
Flaxseed, domestic.....	1,700	2,214	482	28.4	592	26.7	1,061	62.4	1,434	64.8
Flaxseed, imported.....	83,121	82,162	30,982	37.3	4 31,235	4 38.0	51,057	61.4	2 50,527	61.5
Rice bran, domestic.....	225,352	185,148	38,927	17.3	32,584	17.5	172,796	76.9	139,296	75.2
Rice bran, imported.....	160	1,239	26	16.3	182	14.7	123	76.8	976	78.8
Castorbeans, imported.....	27,211	26,339	11,938	43.9	11,081	42.1	14,761	54.2	14,091	53.5
Safflowerseed, imported.....	90,857	59,831	32,380	35.6	21,955	36.7	56,559	62.3	37,228	62.2
Tung nuts, domestic.....	25	---	7	28.0	---	--	12	48.0	---	--
Total.....	428,426	356,933	114,742	----	117,429	----	296,369	----	243,552	----
Total domestic.....	413,320	411,664	106,457	----	119,973	----	281,045	----	274,073	----
Total imported.....	1,442,377	1,257,817	364,529	----	324,297	----	986,532	----	873,911	----
Total.....	1,855,697	1,669,481	470,986	----	444,270	----	1,267,577	----	1,147,984	----

<sup>1</sup> Between 163 and 176 mills reported crushings each month during 1960. <sup>2</sup> Added moisture in cake and meal often accounts for total product above tonnage crushed. <sup>3</sup> Also used as an edible oil. <sup>4</sup> Preliminary. <sup>5</sup> Used primarily as an edible oil.

Japanese Ministry of Agriculture and Forestry.

TABLE 3.--Supply and distribution: Fats and oils, Japan, 1958-61

Item	1958	1959	1960	1961 forecast
<u>SUPPLY</u>				
Beginning stocks, January 1:	1,000 m.t.	1,000 m.t.	1,000 m.t.	1,000 m.t.
Edible.....	36.2	39.6	43.2	53.1
Industrial.....	7.9	3.3	6.6	12.6
Total stocks.....	44.1	42.9	49.8	65.7
Production:				
Edible:				
Vegetable oil <sup>1</sup> .....	344.9	403.5	451.3	451.6
Marine oil <sup>2</sup> .....	142.7	156.6	134.6	171.4
Butter (fat content).....	10.6	9.8	9.7	10.0
Animal fats and oils <sup>3</sup> .....	42.4	47.3	41.8	46.4
Total edible.....	540.6	617.1	637.4	679.4
Industrial:				
Vegetable oils <sup>4</sup> .....	29.8	42.5	43.8	46.4
Sperm oil.....	39.9	37.9	31.6	35.4
Total industrial.....	69.7	80.4	75.4	81.8
Total production.....	610.3	697.5	712.8	761.2
Imports:				
Edible:				
Vegetable oil.....	13.1	19.4	18.9	27.7
Marine oil.....	1.5	1.5	1.0	1.0
Butter, margarine and shortening.....	.2	.2	.9	1.1
Animal fats and oils.....	7.0	14.2	17.7	20.0
Total edible.....	21.8	35.3	38.5	49.8
Industrial:				
Vegetable oil.....	4.5	5.3	5.6	6.3
Animal fats and oils <sup>5</sup> .....	115.0	140.8	175.6	164.0
Total industrial.....	119.5	146.1	181.2	170.3
Total imports.....	141.3	181.4	219.7	220.1
Total supply:				
Edible.....	598.6	692.0	719.1	782.3
Industrial.....	197.1	229.8	263.2	264.7
Total.....	795.7	921.8	982.3	1,047.0
<u>DISTRIBUTION</u>				
Exports:				
Edible:				
Vegetable oil.....	19.2	25.2	22.2	20.0
Marine oil.....	91.8	84.5	84.6	111.0
Other.....	.7	1.2	3.9	2.8
Total edible.....	111.7	110.9	110.7	133.8
Industrial oil <sup>6</sup> .....	16.9	19.7	21.7	5.1
Total exports.....	128.6	130.6	132.4	138.9
Consumption: (estimate)				
Edible.....	328.4	392.8	431.7	469.0
Industrial <sup>7</sup> .....	295.8	348.5	352.5	379.5
Total consumption.....	624.2	741.3	784.2	848.5
Ending stocks, December 31:				
Edible.....	39.6	43.2	53.1	53.0
Industrial.....	3.3	6.7	12.6	6.6
Total stocks.....	42.9	49.9	65.7	59.6
Total distribution.....	795.7	921.8	982.3	1,047.0

<sup>1</sup> Crushed from imported and domestic oilseeds primarily soybeans, rapeseed and mustard, coconut, palm kernel, rice bran, cottonseed, kapok, safflower, sesame, and other oilseeds. <sup>2</sup> Cod and shark liver, fish, and whale oils. <sup>3</sup> Beef tallow and lard. <sup>4</sup> Linseed, castor, perilla, and tung oils. <sup>5</sup> Industrial tallow and grease. <sup>6</sup> Primarily sperm oil. <sup>7</sup> Including unreported uses.

Compiled from official and other sources.



TABLE 4.--Supply and distribution: Oilseed cake and meal, Japan, 1957-61

Item	1957	1958	1959	1960	1961 forecast
Supply:					
Beginning stocks January 1.....	<i>Metric tons</i> 32,121	<i>Metric tons</i> 35,744	<i>Metric tons</i> 55,139	<i>Metric tons</i> 48,797	<i>Metric tons</i> 36,488
Production.....	912,082	1,042,337	1,167,659	1,302,541	1,372,063
Imports.....	2,209	15,472	10,974	787	100,000
Total supply.....	946,412	1,093,553	1,233,772	1,352,125	1,508,551
Distribution:					
Exports.....	4,741	6,473	21,004	18,569	20,000
Consumption:					
Food <sup>1</sup> .....	302,600	289,000	338,900	366,982	399,800
Feed (cake and meal):					
Copra.....	14,970	13,890	17,070	24,007	22,129
Linseed.....	33,770	27,700	41,010	46,910	48,560
Rapeseed.....	9,820	9,720	9,890	9,360	10,260
Soybean.....	134,100	219,427	248,488	271,000	327,000
Others.....	13,600	53,600	78,600	113,600	125,000
Total feed.....	206,260	324,337	395,058	464,877	532,949
Fertilizer and other.....	397,067	418,604	430,013	465,209	495,802
Total consumption.....	905,927	1,031,941	1,163,971	1,297,068	1,428,551
Ending stocks.....	35,744	55,139	48,797	36,488	60,000
Total distribution.....	946,412	1,093,553	1,233,772	1,352,125	1,508,551

<sup>1</sup> Soybean meal only.

Compiled from official and other sources.

Supplies of edible fats and vegetable oils in 1961 are expected to total around 782,300 metric tons, nearly 10 percent higher than in 1960. Output of beef tallow, butter, lard, and other animal fats is expected to increase slightly, but marine oils produced are expected to be up significantly. Vegetable oil production is expected to be at about 1960 levels, but 10 percent over 1959.

Industrial fats and oils supplies are expected to be at 1960 levels and also more than 10 percent over 1959. Rice-bran processing is expected to continue to expand in 1961 and add to total edible oil and industrial supplies.

Supplies of oilseed cake and meal are expected to total more than 1.5 million tons in 1961, up over 10 percent from last year. Demand for feed use, which is the major factor increasing total supply, will be around 533,000 tons, more than double the 1957 rate.

## Edible Fats and Oils Industries

### Oilseed Crushing and Refining Industry

Industry Trends.--Japan's integrated oilseed-crushing and vegetable-oil-refining industry is emerging as a modern large-scale industry with advanced technical equipment and know-how. Nevertheless, it is supported by a much less technically developed, very small-scale crushing industry that processes vegetable oilseeds and nuts for local consumption.

Most of the large crushing plants have been in operation for many years, and modern facilities have been, or are now being, installed. Continuous solvent extraction units, semicontinuous or continuous deodorizers, continuous refining plants, improved seed-cleaning equipment, and modern packaging and other modern production facilities are

TABLE 5.--Supply and distribution: Fats and oils, plan for fiscal year beginning April 1, 1961, Japan<sup>1</sup>

Source	Domestic consumption					Exports	Production total	Equivalent in raw materials	Equivalent as refined oil
	For food		For industrial purposes	Total domestic consumption					
	Edible oil	For margarine and other processing							
					Total oil				
Imports:	1,000 m.t.	1,000 m.t.	1,000 m.t.	1,000 m.t.	1,000 m.t.	1,000 m.t.	1,000 m.t.	1,000 m.t.	1,000 m.t.
Soybean oil.....	135.6	4.1	9.7	139.8	149.3	8.5	157.8	928.0	134.2
Rapeseed oil.....	11.1	--	--	11.1	11.1	--	11.1	30.0	10.5
Mustard oil.....	.8	--	--	.8	.8	--	.8	5.0	.8
Copra (coconut oil).....	--	12.7	29.3	12.7	37.0	--	37.0	58.8	11.5
Cottonseed.....	5.9	12.2	1.4	18.1	18.1	--	18.0	100.0	13.4
Safflower.....	16.6	--	4.6	16.6	21.2	--	21.2	60.0	15.9
Palm kernel.....	--	7.9	14.6	7.9	21.0	--	21.0	44.6	7.1
Kapok.....	1.3	1.9	3.1	3.2	6.3	--	6.3	33.2	2.9
Sesame oil.....	6.5	--	--	6.5	6.5	.1	6.6	15.0	6.2
Peanut oil.....	.5	--	.5	.5	1.0	--	1.0	2.4	.5
Linseed oil.....	--	--	29.1	--	29.1	--	29.1	83.1	--
Castor oil.....	--	--	10.0	--	10.0	1.0	11.0	27.4	--
Beef tallow.....	--	25.2	119.8	25.2	142.9	--	142.8	--	23.4
Lard.....	13.0	--	--	13.0	13.0	--	13.0	--	13.0
Hog grease.....	30.0	.5	--	30.5	30.5	3.0	33.5	--	27.4
Cottonseed oil.....	--	2.5	--	2.5	2.5	--	2.5	--	2.5
Palm oil.....	2.0	2.2	13.0	4.2	17.2	--	17.2	--	3.3
Olive.....	( <sup>3</sup> )	--	.7	( <sup>3</sup> )	.7	--	.7	--	( <sup>3</sup> )
Tung oil.....	--	--	5.4	--	5.4	--	5.4	--	--
Other.....	4.8	.4	7.0	5.1	12.1	--	12.4	--	5.2
Total.....	228.1	69.6	248.2 4 (10.2)	297.7	535.7	12.6	548.3	1,387.5	277.8
Domestic production:									
Rapeseed oil <sup>3</sup> .....	93.3	--	5.0	93.3	98.4	( <sup>3</sup> )	98.4	266.0	89.6
Rice bran oil.....	26.4	3.6	6 27.2	30.0	45.2	--	45.2	265.9	18.0
Finback whale oil.....	--	17.1	19.4	17.1	19.4	108.6	128.0	--	15.7
Fish oil.....	--	27.6	39.4	27.6	39.4	2.9	42.3	--	25.4
Sperm whale oil.....	--	--	33.3	--	33.3	2.1	35.4	--	--
Hog grease.....	3.0	3.3	--	6.3	6.3	--	6.3	--	5.7
Beef tallow.....	--	--	8.0	--	8.0	--	8.0	--	--
Linseed oil.....	--	--	.6	--	.6	--	.6	1.7	--
Tung seeds.....	--	--	.2	--	.2	--	.2	.6	--
Other.....	.5	--	3.0	.5	3.5	--	3.5	--	.5
Total.....	123.2	51.6	136.1 4 (44.7)	174.8	254.3	113.6	67.9	534.2	154.9
Grand total.....	351.3	7 121.2	4 (54.9)	472.5	790.0	126.2	916.2	1,921.7	432.7

<sup>1</sup> Per capita daily oil intake: 12.5g. Population, 94,850,000, consumption of refined oil, 432,750 m.t. <sup>2</sup> Import goal of cottonseed oil provisionally set at 2,500 tons salad oil will be decided in consideration of the production estimate of domestic cottonseed oil and production. Goal of mayonnaise. <sup>3</sup> Less than 100 tons. <sup>4</sup> Figures in parentheses represent hydrogenated edible oils included in total for foods. <sup>5</sup> Estimate of domestic production of rapeseeds; 266,000 m.t. <sup>6</sup> Represents the quantity added by 12,000 m.t. of dark oil produced during the process of refining 30,000 m.t. of low fatty acid oil for food purpose. <sup>7</sup> Production goal of margarine and shortening, 95,000 m.t. margarine for home use, 16,000 m.t., for industrial use, 31,000 m.t. Production of shortening: 48,000 m.t.

Food agency Oil-Fat Division, Japanese Ministry of Agriculture and Forestry.



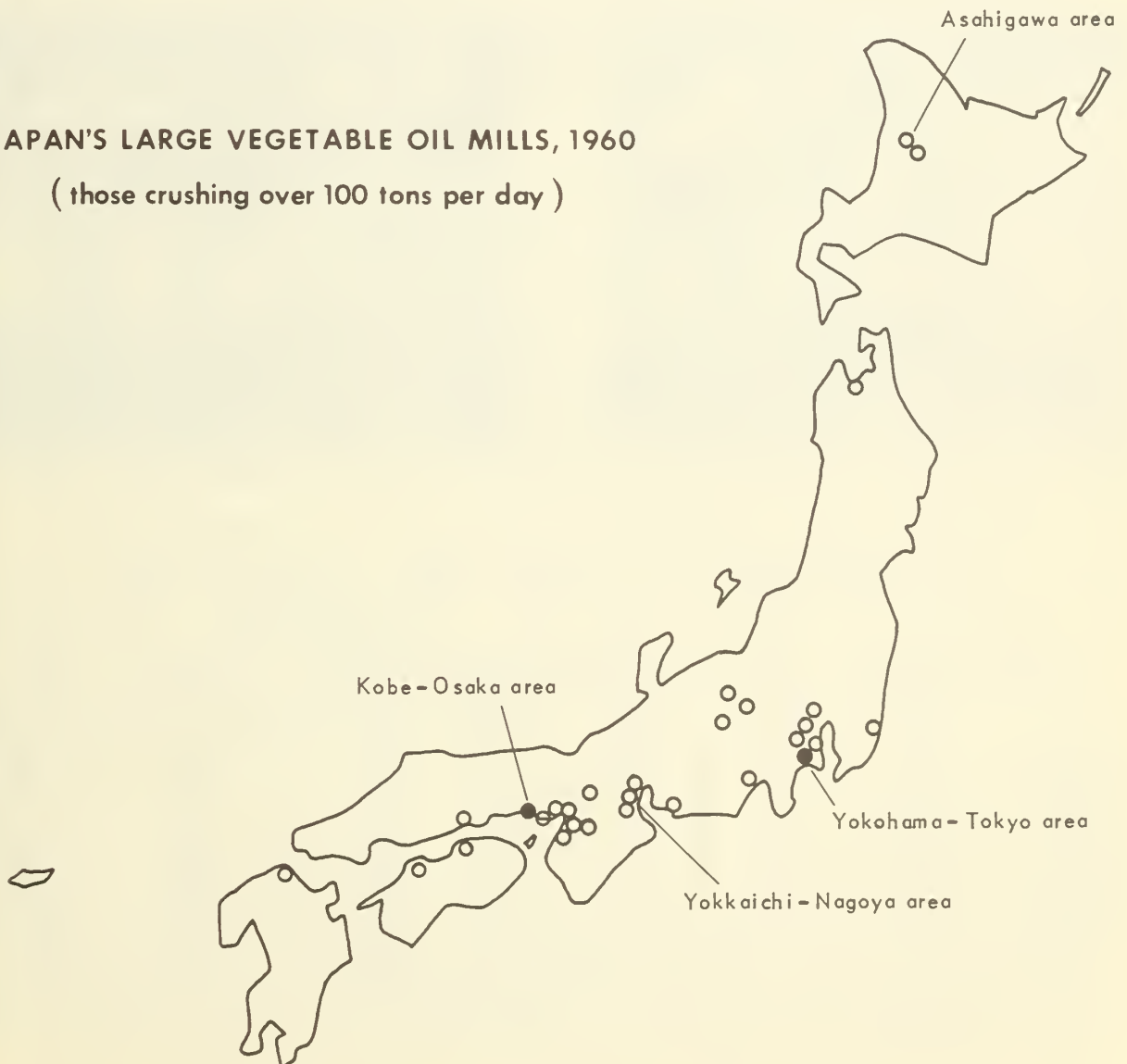
found at most of the larger plants. Modernization at these plants is also being extended to materials handling. The adoption of pneumatic and other improved conveyors and electronically controlled equipment is resulting in time and labor savings in the production of fats and oils. Packing and product-preparation equipment is being modernized to increase production of consumer-type packaging.

Because the Japanese use mainly liquid vegetable oils, the volume of oil hydrogenated and plasticized into solid fats is of secondary importance. Each of the vegetable oils mills produces and markets its own refined, deodorized edible oil for consumer consumption. As a result, each has refining facilities, in direct contrast with the practice in the United States where crushing mills and refineries are not usually integrated. Hydrogenated fats are usually produced by the margarine and shortening manufacturers.

Location.--In an effort to improve efficiency, crushing plants are being moved from locations with disadvantages for receiving bulk shipments of oilseeds to new improved sites on deep water, many capable of receiving bulk shipments directly from ocean steamers, or to sites that show future potential for this.

### JAPAN'S LARGE VEGETABLE OIL MILLS, 1960

( those crushing over 100 tons per day )



As shown on the map, 24 of the 29 large mills crushing over 100 tons per day are located at or near the excellent eastern port facilities. Many of the other 5 mills receive imported oilseeds by rail. Small mills, of course, are located throughout Japan; nearly every village has its own crushing center for locally grown oilseeds.

Size and Number of Mills.--At the 29 large modern crushing mills, continuous solvent extraction plants with the latest technical developments for producing low-oil-content and high-protein meal are being installed at a rapid rate. Over 25 are already in use, at least 4 were installed in 1960, and several were in the assembly stage early in 1961. Most of these mills also have refining operations.

The number of mills is declining. In 1959, there were 1,368 in Japan; 1,137, or 83 percent of these, were small mills crushing less than 5 tons per day and were located throughout the country. In 1951, the country had  $2\frac{1}{2}$  times more mills crushing oilseeds--3,473. Since that time there has been a slight increase in the number of large mills and a decrease in the number of small ones. And particularly, there has been a decline in the number of mills crushing below 5 tons per day.

Crushing Capacity and Monthly Rate.--The capacity of the industry in late 1960 is estimated at around 5 million metric tons per year, but during 1961 only around 2 million tons of oilseeds will be crushed. The idle crushing time in Japan represents 63 percent of total capacity. However, the industry now has the solvent extraction capacity to crush an additional 1 million tons of soybeans each year. Annual solvent extraction capacity of both continuous and batch equipment is now over 3 million tons.

Oilseed-crushing operations have been maintained at high uniform monthly levels in recent years in spite of operating rates at one-third of capacity. Crushing of imported oilseeds has been unusually high in the first half of the year, whereas domestic oilseed crushings have been heavy in the latter half. As the industry changeover to continuous solvent operations is nearing completion, the crushing of imported oilseeds can be expected to continue at a higher rate throughout the year.

The average monthly crush in 1960 was around 155,000 tons, and the variation in crushing operations in any one month has not been more than 12 percent from the average month (table 7). The low crushing period is in August, when soybean imports are particularly low compared with the high receipts in the early months of the year. At this time the crushing demand for soybeans is approximately one-third less than in the early months of the year. The larger mills crush over 50 tons per day, and operate from 250 to 350 days each year, but the small mills generally operate 200 days or less. However, some small mills do report operations over 300 days.

TABLE 6.--Vegetable oil mills: Number and crushing capacity, size and type, Japan, 1959

Crushing capacity (in metric tons per day)	Number of mills	Percentage of mills by size	Daily crushing capacity by type of equipment		Total daily crushing
			Solvent extraction (continuous and batch)	Screw press and hydraulic	
		Percent	Metric tons	Metric tons	Metric tons
Less than one.....	512	37	3	223	226
1-4.....	625	46	72	994	1,066
5-9.....	73	5	87	434	521
10-19.....	48	4	238	467	705
20-29.....	24	2	189	302	491
30-39.....	14	1	231	236	467
40-49.....	11	1	362	108	470
50-99.....	32	2	1,273	804	2,077
100 and over.....	29	2	5,843	2,486	8,320
Total.....	1,368	100	8,289	6,054	<sup>1</sup> 14,343

<sup>1</sup> At 330-day operation per year capacity would be 4,750,000 metric tons.



Left, Japanese oilseed-crushing mill; most of them are located where port facilities are available. Below left, silos for storing soybeans in bulk; few crushing mills have these. Below right, moving bagged soybeans by hand rail carts--a practice that is rapidly becoming obsolete.

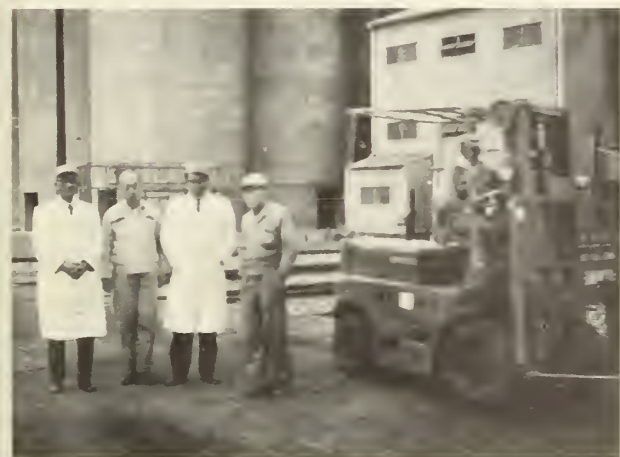


TABLE 7.--Crushing: Selected domestic and imported oilseeds and total, by month, Japan, 1960

Month	Domestic oilseeds			Imported oilseeds		Total crush
	Rapeseed	Rice bran	Total	Soybeans	Total	
	<i>Metric tons</i>	<i>Metric tons</i>	<i>Metric tons</i>	<i>Metric tons</i>	<i>Metric tons</i>	<i>Metric tons</i>
January.....	7,806	19,820	28,834	84,353	127,379	156,213
February.....	6,949	19,515	28,146	97,574	141,054	169,200
March.....	2,487	18,487	22,828	85,983	141,348	164,176
April.....	2,522	17,720	21,327	78,162	128,482	149,809
May.....	2,494	18,923	22,323	73,833	126,816	149,139
June.....	13,983	20,802	35,774	69,566	113,066	148,840
July.....	24,172	20,656	46,130	71,643	109,426	155,556
August.....	26,722	18,926	46,788	57,914	90,408	137,196
September.....	23,032	18,019	43,124	70,062	108,741	151,865
October.....	24,482	18,429	44,422	71,134	114,121	158,543
November.....	19,828	13,818	34,911	73,622	116,106	151,017
December.....	16,912	20,237	38,713	80,892	125,430	164,143
Total.....	171,389	225,352	413,320	914,738	1,442,377	1,855,697
Average monthly crush.....	14,282	18,779	34,443	76,228	120,198	154,641

Data from mills having about 90 percent of total crushings.



Crushing and Refining Methods.--The vegetable-oil mills are multiple affairs capable of crushing and refining all types of oilseeds and vegetable oils. Some mills can crush three or four different types of oilseeds at one time. Those that have installed continuous solvent extraction facilities for crushing soybeans have kept their batch-type crushing facilities for prepressing and solvent extraction of medium-oil-content seeds and materials, such as rapeseed, palm kernels, and cottonseed. Moreover, this equipment can still be used for crushing soybeans when necessary. An additional operation, using expellers for prepressing and a second pressing of high-oil-content seeds and oil-bearing materials, such as copra, is also maintained by some of the mills. Thus, the disadvantages of overcapacity that some of these mills have are offset by their ability to crush the product that is the best buy in oilseeds from any particular market and at any time.

Such an advantage is especially important for a country like Japan, for it is an oil-seed importer and the international fats and oils market is highly changeable. This advantage has evolved from the efforts being made by the industry to maintain the latest technical developments in oilseed processing rather than as a planned development.

Among the small crushing mills, many are equipped with hydraulic presses that crush even less than 5 tons a day, and an even larger number of these small mills utilize hand-operated presses. Such small mills specialize in crushing rapeseed; a sizable proportion of that crop is processed in these local mills. The remainder of the rapeseed produced is crushed in the larger mills by prepressing in screw presses, followed by batch solvent extraction. Also, some mills crush rapeseed in screw presses by giving it a first and second pressing.

Many mills use one or two small screw presses for rapeseed, and process only around 3 to 5 metric tons per day. Sesame and rapeseed oil are often sold to confectioneries, but most of the oil from the small mills is sold to wholesalers for cooking oil without further refining. It has been estimated that about 95 percent of the rapeseed meal is sold for fertilizer. It is valuable for tobacco and fruit and vegetable farming.

Efficiency of the larger vegetable-oil-crushing operations in Japan is shown by the average recovery of soybean oil in the industry of over 17 percent and cottonseed from 17 percent to 19 percent. The weighted oil outturn expressed as a percentage of the raw oilseeds and oil-bearing materials crushed is continually increasing. While the average recovery is not a true measure, because of the variation in oilseed content, this high efficiency was affirmed when it was found that most of the mills were reporting a residual oil content in their cake and meal of less than 1 percent on solvent operations.

Though the crushing facilities of the large mill can justly be called large scale in terms of U.S. mills, they are not large enough to support the operation of an economical-sized refinery. That is one of the problems of the Japanese industry, for relatively small-scale refineries, both continuous and batch type, are maintained, and these are not large enough to handle all the oil produced from the diversified crushing capacity.

Modern deodorizing equipment has been installed at most of the large vegetable-oil mills since the end of World War II, and has improved the quality of the vegetable oils marketed in Japan. Much of this equipment is either of the continuous or semicontinuous type. Furthermore, it is centrally controlled with modern automatic systems that prevent loss and ensure quality.

Also, for refining, continuous processes are being adopted at a rapid rate, and most large refineries either have them or have plans for installing them in the near future. The versatility and advantages of continuous refining have been realized for many years in Japan, and American-, German- and Japanese-designed centrifugal-type continuous equipment is rapidly becoming standard throughout the industry. But only a few of the modern mills have refining facilities that are operated under sanitary conditions such as are found in most of the mills in the United States. However, in the case of fish and marine oils, where considerable variation in the quality of the oil received is encountered, the batch-type refining systems have proved very efficient and adaptable.

Operating Costs.--Although modernization is proceeding at a rapid rate, processing costs and margins still appear to be high. Operating, or factory, costs including refining operations range from \$16.66 to \$19.44 per ton in Japan. Several important factors in establishing high costs are:

(1) The lack of continuity of operations on one oilseed and the inability to maintain plant operation at a high percentage of capacity.

(2) The necessity for maintaining machinery to process all types of oilseeds and oil-bearing materials, as well as both high oil content and low oil content at the same mill.

(3) The present practices used in handling and storing oilseeds in bags at many mills.

(4) The integration of refining and crushing facilities in the industry, which prevents the development of the economic operations of large-scale refining.

(5) The lack of bulk handling equipment for shipping meal and oil.

Although they are rising rapidly as surplus labor disappears, wages are not a big factor in establishing high costs despite the large number of persons now employed in the industry. Average monthly income of workers for the 48-hour work week is equivalent to from \$58.25 at the mills located in small towns to \$83.33 in the larger cities of Yokohama and Osaka. This is supplemented by many forms of bonuses--a 2-month bonus, for example, after 6 months of work. An important factor in the size of the average wage paid in the industry is the smaller pay of women, who work extensively in the packaging operations, as in the U.S. fats and oils industry.

The price of hexane, however, does contribute to the high operating cost in Japan. It costs much more than in the United States because much of it is imported from here. Hexane solvent loss averages around 7 liters per ton of oil-bearing material extracted. Imported hexane from the United States sells at around 45,000 yen per kiloliter (\$125) while domestic hexane, which is considered of somewhat inferior quality, sells for around 40,000 yen per kiloliter (\$111). (A kiloliter is equivalent to 264.18 gallons.)

There is no doubt that the unused capacity of the industry pushes costs high, for utilizing only one-third of total capacity will increase unit fixed costs nearly twice their possible rate. Fixed costs, such as interest and depreciation, are high in Japan and must be weighted against flexibility to handle each type of oilseed available at a given time.

Storage.--Modern oilseed storage facilities, such as silos and loading and unloading facilities, are being constructed at many crushing mills to reduce oilseed handling costs and to insure quality maintenance. Many other mills that still use bagging storage practices for oilseeds have reported their plans for installing bulk conveying systems and new storage facilities.

Stocks of oilseeds maintained at Japanese crushing mills averaged about 138,000 tons during 1960, or about 4 weeks of normal crushing operations. However, this is equal to only 10 days' operation at full capacity. Imported oilseed stocks represent approximately 23 days' operation (84 percent) at normal capacity.

Total stocks of oilseeds are maintained at surprisingly high rates throughout the year as a result of the relationship between domestic production and oilseed imports. Stocks varied less than 17 percent from the average in any one month. Maximum stocks of 155,000 tons, or around 30 days' normal operation, are maintained in the early months of the year--January and February--when imports of soybeans are particularly heavy. Thereafter, stocks decline and are built up again in August and September when domestic rapeseed and imported cottonseed stocks become seasonably high. Stocks are at the lowest levels in November just prior to heavy soybean imports and at the conclusion of the large crush on domestic rapeseed and rice bran.

## Rice-Bran Processing

The rice-bran-processing industry is entirely separate from the oilseed crushing industry, and mills that extract rice-bran oil seldom process other oilseeds. There are now 47 of these mills compared with 286 very small ones in 1950. The industry processed around 225,000 tons of rice bran in 1960 and extracted from this around 38,927 tons, or over 17 percent, of oil. In addition, the industry produced 173,000 tons of rice-bran meal. This compared with 151,200 tons in 1950 and 11,632 tons of oil.

The largest mills use batch-solvent-extraction techniques that are well developed. For example, many large processors extracting nearly 50 tons per day have five extraction vats in each mill, each with a capacity of 2,865 pounds of bran per charge. Smaller plants have small vats; for example, one plant has three extraction vats with a capacity of about 15 tons per day, each handling 880 pounds of bran per charge. After the broken rice and other materials are separated from the bran, it is extracted with normal hexane solvent and the oil is distilled from the miscella mixture of oil and gas. The oil is dewaxed before it is neutralized with soda.

At least seven mills now refine the oil for edible use, and it is estimated that over 10,000 tons of oil is now caustic-soda refined each year at these small mill refineries. The yield rate of edible oil from crude oil is around 60 percent; the remaining dark oil is sold for soap manufacture. Much of the oil is bleached with terra alba and deodorized and winterized.

The returns from rice-bran oil produced for soap are nearly 50 percent less than those from edible rice-bran oil. Since this difference is sufficient to pay for a small refinery in a short time, the rice-bran-oil industry is now in the process of building small refineries at many of the processing plants.

## Margarine and Shortening

Japan's margarine and shortening production in 1960 was 88,600 metric tons, nearly  $4\frac{1}{2}$  times that of 1950. The shortening industry has developed in this short period, and the production of edible hardened or hydrogenated oils has increased from only 6,726 metric tons in 1950 to 53,499 tons in 1960.

TABLE 8.--Margarine and shortening: Number of plants, production, and average capacity, 1958

Plant capacity <sup>1</sup> (in metric tons)	Number of plants	Production capacity <sup>1</sup>	Average capacity <sup>1</sup>
		<i>Metric tons</i>	<i>Metric tons</i>
Less than 5.0.....	5	19	4
5.1-10.0.....	4	26	6
10.1-15.0.....	5	57	11
15.1-20.0.....	5	89	18
20.1-25.0.....	3	65	22
25 and over.....	4	135	34
Total.....	26	391	15

<sup>1</sup> In 8-hour day.

Japanese Ministry of Agriculture and Forestry.



Production of margarine and shortening in fiscal year starting April 1, 1961, is expected to reach 95,000 tons, 7 percent over the 1960 calendar year. Margarine production in 1960 was 43,000 tons compared with 39,900 tons in 1959. Shortening production was only 41,600 tons in 1960, but is expected to be about equal to margarine production in 1961.

The margarine and shortening industry in Japan consists of 26 manufacturers, but a large percent of plant capacity is found in only a few plants: 4 plants have one-third of the industry capacity, which is around 400 metric tons per 8-hour day.

TABLE 9.--Margarine and shortening: Production by type, Japan, 1951-60

Year	Margarine						Shortening		Total
	Household		Bakery		Total		Volume	Percent of total margarine and shortening	
	Volume	Percent of total	Volume	Percent of total	Volume	Percent of total			
	<i>Metric tons</i>	<i>Percent</i>	<i>Metric tons</i>	<i>Percent</i>	<i>Metric tons</i>	<i>Percent</i>	<i>Metric tons</i>	<i>Percent</i>	<i>Metric tons</i>
1951.....	6,043	25.9	15,786	67.7	21,829	93.6	1,504	6.4	23,333
1952.....	5,620	19.3	19,999	68.5	25,619	87.8	3,575	12.2	29,195
1953.....	5,687	14.4	22,361	56.6	28,048	71.0	11,439	29.0	39,487
1954.....	10,424	17.0	35,486	57.8	45,910	74.8	15,424	25.2	61,334
1955.....	8,517	13.0	36,710	55.9	45,227	68.9	20,408	31.1	65,635
1956.....	7,431	12.3	30,132	49.7	37,563	62.0	23,048	38.0	60,611
1957.....	9,474	13.4	30,261	42.9	39,735	56.3	30,791	43.7	70,526
1958.....	10,074	13.5	28,607	38.3	38,681	51.8	35,994	48.2	74,675
1959.....	11,869	14.6	28,057	34.4	39,926	49.0	41,617	51.0	81,543
1960.....	13,601	15.3	29,405	33.2	43,006	48.5	45,632	51.5	88,638

Japan Margarine and Shortening Makers Association.

TABLE 10.--Margarine and shortening: Changes in kinds of fats and oils used, Japan, averages 1945-49 and 1950-54, annual 1955-59<sup>1</sup>

Kind	Average 1945-49	Average 1950-54	1955	1956	1957	1958 <sup>2</sup>	1959 <sup>3</sup>
	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
Animal and marine oils:							
Tallow (including lard).....	1.6	14.8	13.4	10.9	21.2	21.6	21.0
Whale oil.....	47.5	40.3	28.4	23.8	26.3	21.4	26.0
Fish oil.....	1.4	3.5	10.5	19.8	16.4	26.4	20.0
Total.....	50.5	58.6	52.3	54.5	63.9	69.4	67.0
Palm oils:							
Coconut oil.....	25.7	17.2	15.6	11.2	10.0	11.8	11.0
Palm oil.....	--	3.0	17.3	18.1	9.6	2.7	3.0
Palm kernel oil.....	--	--	2.3	3.7	3.3	4.4	5.0
Total.....	25.7	20.2	35.2	33.0	22.9	18.9	19.0
Vegetable oils:							
Soft oils.....	23.8	17.5	10.1	9.8	8.9	9.9	13.5
Other.....	--	3.7	2.4	2.7	4.3	1.8	0.5
Total.....	23.8	21.2	12.5	12.5	13.2	11.7	14.0
Total fats and oils.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Total fats and oils used...	<i>Metric tons</i> 9,961	<i>Metric tons</i> 29,404	<i>Metric tons</i> 58,038	<i>Metric tons</i> 54,325	<i>Metric tons</i> 64,207	<i>Metric tons</i> 68,815	<i>Metric tons</i> 74,530

<sup>1</sup> 1945-49 average of fiscal years April-March.

<sup>2</sup> Preliminary.

<sup>3</sup> Program.

<sup>4</sup> Cottonseed, soybean, kapok, rapeseed, and rice bran.

Japanese Margarine Association.

TABLE 11.--Margarine: Proportion of domestic and imported fats and oils used, Japan, fiscal year beginning April 1, 1959

Item	Volume	Percent of total
Animal and Marine:		
Domestic:		
Lard.....	Metric tons 724	Percent 0.9
Fish oil.....	21,334	27.7
Whale oil.....	16,415	21.3
Total.....	38,473	49.9
Imported:		
Beef tallow.....	16,334	21.2
Lard.....	2,283	3.0
Total.....	18,617	24.2
Total animal and marine.....	57,090	74.1
Vegetable:		
Domestic:		
Rice bran.....	1,443	1.9
Rapeseed.....	57	.1
Other.....	538	.7
Total.....	2,038	2.7
Imported:		
Cottonseed.....	2,975	3.8
Kapok.....	1,481	1.9
Safflower.....	277	.4
Soybean.....	415	.5
Coconut.....	5,627	7.3
Palm.....	2,627	3.4
Palm kernel.....	3,379	4.4
Other.....	1,202	1.5
Total.....	17,983	23.2
Total vegetable.....	20,021	25.9
Total fats and oils.....	77,111	100.0

Japan Margarine and Shortening Makers Association.

Japan's margarine and shortening industry has now modernized and, although the industry is still small, the Votator, or internal chilling and plasticizing method of processing which gives quick cooling and emulsifying simultaneously and continuously, has been accepted industry-wide. After 1950, under free competition, all 26 firms in the industry switched over to this type of equipment, and yearly capacity of the industry is now around 110,000 to 120,000 tons. Several plants are expected to install new equipment in the coming year. In recent years, 60 percent to 90 percent of the total capacity has been utilized.

Table margarine reportedly accounts for only 20 percent of total margarine production, the bulk of the margarine being produced for use in the baking and confectionery trade. Table margarine production is faced with the difficult problem of overcoming consumer opinion which reflects a history of bad taste and smell that was formerly found in the margarines of lower grade. However, the industry now is making efforts to create a demand for a margarine of wholesome quality. In Japan, the production of margarine has not had to overcome competition with butter as it has in the United States and Europe. This factor may account for the lack of emphasis on quality in the past. Nevertheless, margarine was originally marketed as artificial butter in Japan.

The small percentage of production reportedly represented by table margarine does not show the true picture on direct household consumption. At least 10,000 tons of bulk baking margarine is sold for household use in department and food stores. Thus total consumption of margarine in the home accounts for over 50 percent of total margarine production. Obviously, the Japanese home market offers a larger potential for quality margarine and shortening made with cottonseed and soybean oils than has been previously foreseen. Moreover, while trends in home consumption indicate a growing market for household margarine and shortening, they further point up the possibility of creating a large demand by reducing consumer costs. Bulk margarine sold in this manner was priced at 65 to 70 percent below the packaged price.

Present trends indicate that steps will be taken to improve the quality of household margarine in Japan by providing margarine containing dairy products. Most of the bulk margarine sold for household use is made with whale and fish oil emulsified with salt water and only a small percentage includes cultured milk fortified with Vitamin A. Bulk margarine sold for household use is generally used for cooking rather than for table use, but it is expected that this demand will offer a growing market for quality shortening.

Enriched margarine sold in Japan contains 25,000 IU of Vitamin A per pound, but legal requirements are 15,000 IU per pound. This type of margarine is also used in school lunch programs. Furthermore, the demand for margarine is growing as the people become more familiar with its use and learn its significance in improving their diet.

The rapid expansion in the production and consumption of shortening has resulted from its increased use in the baking industry. As the demand for higher grade shortenings increases, the use of vegetable oils in shortening manufacturing should increase. However, the lower priced vegetable oil is the key to their future use in the shortening and margarine industry. Only a small volume of vegetable all-hydrogenated shortening is produced in Japan, since vegetable oils cost the manufacturer nearly twice as much as hydrogenated whale and fish oils and unhydrogenated palm oil. The price of refined soybean oil in November-December 1960 was around 17.5 cents per pound delivered at the margarine plant compared with 8.8 cents per pound for whale oil.

There is a growing demand from cake bakers and the public for super-glycerinated shortening in Japan, but white margarine with no color and salt is now used extensively. Lard may become more and more competitive with margarine and shortening as its availability increases, but present production is low and most of the lard produced is used locally.

Shortening production has been stimulated by the regulations of Prefecture (State) Governments stipulating that shortening be used in baking bread for the school lunch programs.

## Oilseed Food Industries

Large quantities of soybeans, both green and dried, peanuts, and sesameseed are used directly as food or are manufactured into foods in Japan. In 1959 and 1960, 500,000-535,000 tons of soybeans, 70,000-93,000 tons of peanuts (shelled), and 15,000-20,000 tons

TABLE 12.--Consumption as food: Oilseeds and oil-bearing materials, Japan, 1957-61

Oilseed	1957	1958	1959	1960	1961 forecast
	<i>Metric tons</i>	<i>Metric tons</i>	<i>Metric tons</i>	<i>Metric tons</i>	<i>Metric tons</i>
Soybeans.....	497,339	483,868	496,753	532,218	552,000
Peanuts (shelled).....	60,501	65,000	69,478	93,011	92,100
Sesame seed.....	11,417	14,965	18,911	15,221	15,923
Total.....	569,257	563,833	585,142	640,450	660,023

Compiled from official and other sources.



of sesame seed were so used. The soybean-using food industries are important industries in Japan, and U.S. soybeans are growing in popularity in these industries. Soybeans are recognized as the only vegetable that meets the nutritional requirements of protein for growth as do such animal products as meat and eggs. The Japanese American Soybean Institute in Tokyo is actively promoting U.S. soybeans for food uses and has promoted soybeans as the meat of the field because of the excellence of their amino acids.

The soybean-using food industries produce traditional foods that contribute essential protein to the diet of the Japanese people. More soybeans are used directly for food than are grown in Japan, and the cake and meal from an additional 420,000 tons of soybeans are now used each year. The main soybean foods are:

Miso--a soybean and rice paste used for soups.

Shoyu--a soybean sauce used for seasoning.

Tofu--soybean curd used in soup.

Aburaage--fried tofu.

Frozen tofu.

Natto--fermented cooked soybeans.

Kinako--full-fat soy flour from grinding roasted soybeans.

Monosodium glutamate--extract of fermented soybeans and rice used as a seasoning compound. A low-grade shoyu is a byproduct.

Tonyu--soybean milk, cooked water-extract of soybeans, not widely produced in Japan at the present time.

Continuous solvent extraction of soybeans makes good flakes for shoyu because the heat is too high in other processes. However, these flakes do not make particularly good miso. New meal-toasting systems used by some continuous-solvent-extraction units in Japan have improved the quality of meal by removing the solvent with superheated steam vapors which bind the protein in the meal.

The production of miso is an ancient tradition in Japan. There are about 3,200 to 3,800 plants, and a large volume of home-made miso is produced.

The proportion of soybeans and rice in miso varies. The usual formula is 50 percent soybeans and 50 percent rice. Some miso is made, however, with 100 percent soybeans. About 117,600 tons of soybeans and 52,300 tons of defatted meal (expeller cake is thought to be the best) are required by this industry. Miso consumption is estimated at 28.9 grams per capita per day.

In the past, U.S. soybeans were not used extensively in the manufacture of miso, since domestic soybeans, such as those from Aomori with white eyes, or hilums, were preferred. However, in recent years the use of preserved soybeans of a U.S. variety is increasing. Even Hokkaido beans were reported to be acceptable despite the fact that they have black eyes that impart a dark color to the miso. U.S. beans do not usually cook evenly because of their hard seed coats, but when ground and precooked they are very well accepted. Aomori beans with 15 percent moisture are said to cook better than U.S. soybeans.

The process used to make miso requires soaking soybeans for 18 to 20 hours, mixing the ground cooked soybeans with cooked rice and koji inoculation for fermentation and storing in wooden vats for 1 or 2 months in a warm heat-controlled room. The storage time was formerly 1 year, but with recent improvement in heat control to aid fermentation, this long period is unnecessary.

The total demand for miso is not increasing significantly, if at all, but some of the modern plants report that demand for their quality packaged products is increasing.

TABLE 13.--Consumption: Soybeans and soybean meal, by use, Japan, 1960-62 (fiscal years, beginning April 1)

Use	1960		1961 <sup>1</sup>		1962 <sup>1</sup>	
	Soybeans	Soybean meal	Soybeans	Soybean meal	Soybeans	Soybean meal
	<i>Metric tons</i>	<i>Metric tons</i>	<i>Metric tons</i>	<i>Metric tons</i>	<i>Metric tons</i>	<i>Metric tons</i>
For oil.....	812,000	---	767,000	---	928,000	---
For food:						
Miso.....	117,600	52,300	117,600	53,000	130,000	50,000
Shoyu.....	18,500	153,800	17,600	155,000	29,000	170,000
Tofu and aburaage.....	254,800	20,000	256,300	20,000	280,000	20,000
Frozen tofu.....	27,100	---	27,500	---	40,000	---
Natto.....	22,800	---	23,400	---	30,000	---
Kinako.....	6,200	---	6,600	---	10,000	---
Monosodium glutamate.....	---	64,800	---	66,000	---	89,000
Others.....	10,000	30,000	10,000	40,000	20,000	40,000
Total.....	457,000	320,900	459,000	334,000	539,000	369,000
For chemical industry.....		14,800		15,000 (13,000)		17,000
For feed and fertilizer <sup>2</sup> .....		281,000		242,000		317,000
Exports.....		4,300		4,000		4,000
Total.....		300,100		261,000 (13,000)		338,000
Grand total.....	1,269,000	621,000	1,226,000	595,000	1,467,000	707,000

<sup>1</sup> Estimated.<sup>2</sup> Figures in parentheses for feed and fertilizer represent imported meal for feed which is not included in the import budget.

The shoyu, or soybean sauce, industry is large and the capital investment in the equipment is heavy. Still, many of the 5,000 producers have small plants. The Japanese consume on the average about one-fourth gallon of shoyu a month, or 3 gallons per capita per year. This takes around 18,500 tons of soybeans and 155,000 tons of soybean defatted meal a year. At the present time the capital turnover in the industry is slow, and the income situation and demand do not warrant expansion. However, consumption and export increases are possible from the relatively low-price, high-quality products available. Consumption of soybeans by this industry is set at considerably higher rates in 1961-62.

The process of making shoyu requires the mixing of boiled soybeans and roasted wheat, half and half; inoculation with a bacteria culture; mixing with equal weight of salt water brine; allowing this mixture to ferment for up to 1 year; then pressing the ferment (moromi) three times in hydraulic presses. The extract is refined to soy sauce. A small amount of soybean oil is skimmed off the sauce and used for a cutting oil; production is around 1,000 tons a year from this industry. The cake from the pressing contains 4 percent salt, but it is an ideal hog feed as well as a fertilizer. Around 80,000 to 110,000 tons a year are produced.

A taru (4 $\frac{1}{2}$  gallons) of shoyu or soy sauce sells for around \$3.60 wholesale. A large volume of soy sauce is now being exported to the United States.

There are around 50,000 small tofu plants in Japan, each processing a small quantity of soybeans daily. The demand for soybeans, however, is large and increasing. About three-fifths of the soybeans used are imported. From around 250,000 tons of soybeans in 1959-60 and 1960-61, the demand will increase to 280,000 in fiscal 1961-62. Also, the demand for frozen tofu will be 40,000 tons. Tofu usually is sold in the front part of each plant, which is usually located in the local shopping area.

The process of making tofu is simple. After soybeans are soaked for 8 to 14 hours, they are ground and boiled for 15 minutes. This mixture is filtered and coagulated with

calcium carbonate or other calcium and allowed to set and soak. Tofu is cut and sold for around 1 cent a small slice. One hundred pounds of dry beans are processed as about 200 pounds of soaked soybeans.

About 60,000 tons of soybeans will be used for natto, knako, and such other uses as soybean flour in 1961-62. Soybean flour has been recently placed on the market by soybean crushers and there appears to be a growing market for it in Japan. Monosodium glutamate processors are utilizing between 60,000 and 70,000 tons of soybean meal each year.

## Industrial Fats and Oils

Consumption of inedible fats and oils in Japan did not reach the prewar level until 1954. Since that time it has continued to increase, and is now nearly double the prewar level. However, of the total consumption of fats and oils, the inedible ones in the prewar period accounted for around 70 percent to 75 percent, but, in the postwar and following years, these have decreased in importance and are now less than half of the total consumption.

Tallow and grease production is very low in Japan; only around 3,000 tons are produced each year. But the livestock industry is growing and, along with it, production of the inedible animal fats will probably increase.

## The Soap Industry

Japan has around 260 soap factories in operation. An estimated 220 are located in the 3 large cities of Tokyo, Osaka, and Nagoya. Most of the plants (94 percent) are relatively small; only 15 have more than 300 employees. These large plants produce

TABLE 14.--Consumption: Edible and inedible fats and oils, Japan, averages 1936-39 and 1940-44, annual 1945-61

Year	Edible		Inedible		Total
	Volume	Percent of total	Volume	Percent of total	
	1,000 m. t.	Percent	1,000 m. t.	Percent	1,000 m. t.
1936-39.....	78.5	26.1	222.0	73.9	300.5
1940-44.....	61.2	29.6	145.9	70.4	207.1
1945.....	19.9	23.5	65.0	76.5	84.9
1946.....	12.2	44.9	15.0	55.1	27.2
1947.....	17.0	50.7	16.5	49.3	33.5
1948.....	43.8	54.5	36.5	45.5	80.3
1949.....	69.8	45.8	82.5	54.2	152.3
1950.....	90.0	44.6	112.0	55.4	202.0
1951.....	138.1	47.3	153.6	52.7	291.7
1952.....	154.7	49.0	161.0	51.0	315.7
1953.....	177.5	46.3	205.5	53.7	383.0
1954.....	191.0	48.5	203.0	51.5	394.0
1955.....	259.0	50.0	259.0	50.0	518.0
1956.....	288.0	52.9	256.0	47.1	544.0
1957.....	294.1	48.6	311.5	51.4	605.6
1958.....	328.4	52.6	295.8	47.4	624.1
1959.....	392.8	53.0	348.5	47.0	741.3
1960 <sup>1</sup> .....	431.7	55.0	352.5	45.0	784.2
1961 <sup>1</sup> .....	469.0	55.3	379.5	44.7	848.5

<sup>1</sup> Preliminary.

Japanese Ministry of Agriculture and Forestry and other sources.



TABLE 15.--Soap and synthetic detergents: Production in Japan, 1952-60

Type	1952	1953	1954	1955	1956	1957	1958	1959	1960
	<i>Metric tons</i>	<i>Metric tons</i>	<i>Metric tons</i>	<i>Metric tons</i>	<i>Metric tons</i>	<i>Metric tons</i>	<i>Metric tons</i>	<i>Metric tons</i>	<i>Metric tons</i>
Toilet soap.....	38,157	45,481	51,595	56,367	59,680	59,227	60,396	65,017	67,410
Laundry soap.....	92,448	122,223	153,956	179,010	181,616	184,735	192,832	202,297	170,353
Powder soap.....	11,253	15,347	22,746	33,373	44,729	63,346	81,935	99,365	94,553
Others.....	8,385	8,827	8,979	10,427	10,597	12,423	11,370	13,526	15,088
Total.....	150,243	191,878	237,276	279,177	296,622	319,731	346,533	380,205	347,404
Against the previous year	<i>Percent</i> 106	<i>Percent</i> 128	<i>Percent</i> 124	<i>Percent</i> 118	<i>Percent</i> 106	<i>Percent</i> 108	<i>Percent</i> 108	<i>Percent</i> 110	<i>Percent</i> 91
Synthetic detergents.....	7,548	10,842	12,231	15,468	22,447	24,588	30,639	48,263	52,995
Against the previous year	<i>Percent</i> 150	<i>Percent</i> 144	<i>Percent</i> 113	<i>Percent</i> 126	<i>Percent</i> 145	<i>Percent</i> 110	<i>Percent</i> 125	<i>Percent</i> 157	<i>Percent</i> 110

All Japan Soap Association.

54 percent of the total output and manufacture 62 percent of the toilet soap. Some vegetable-oil crushing and refining mills also have soap plants which use the soap stock from the refinery, some low-grade hydrogenated fats and oils and fatty acids, and imported tallow in making soap. (Tallow soap is ideal for the soft water found in Japan.) Also, Japan has a modern fatty-acid industry that processes materials for the soap industry.

Soap production has increased rapidly since 1952. In 1959, it reached 380,205 tons compared with 265,000 tons in the prewar period. Production of laundry soap has increased steadily and powdered soap and synthetic detergents have gone up rapidly. As a result of the increase in the production of detergents from petroleum products, the government has estimated that the production of soap will reach 407,000 tons in 1960 and 418,000 tons in 1961, but will level off around 420,000 in 1962. Production of synthetic soaps is expected to increase from 25 percent to 40 percent in 1960 according to the All Japan Soap Association. The per capita use of soap in Japan is only around 9 pounds per year (about 27th position in the world), an indication that there is a potential market for larger quantities of inedible fats and oils for soap use in Japan.

The industry is now turning to the modern continuous soap-making equipment available from abroad, and, as a result, has improved its technical facilities and processes. Moreover, it also has improved the quality and packaging of its products.

Beef tallow (an important ingredient for soap), is on the Automatic Approval list for imports, and shipments from the United States have increased rapidly. Total imports of tallow and other industrial animal fats have increased 25 percent over the 1959 level (table 3).

TABLE 16.--Tallow and greases: Imports, by country of origin, Japan, 1953-60

Country of origin	1953	1954	1955	1956	1957	1958	1959	1960
	<i>Metric tons</i>	<i>Metric tons</i>	<i>Metric tons</i>	<i>Metric tons</i>	<i>Metric tons</i>	<i>Metric tons</i>	<i>Metric tons</i>	<i>Metric tons</i>
Canada.....	2,358	1,701	1,437	1,996	4,806	4,623	3,169	2,924
United States.....	94,695	91,677	98,148	95,214	100,984	95,403	113,561	143,857
Australia.....	2,374	954	3,200	5,210	11,628	8,178	8,047	7,185
New Zealand.....	828	665	1,412	3,082	5,881	6,498	4,000	3,729
Netherlands.....	---	10	12,841	181	---	---	---	---
Others.....	109	---	371	180	435	94	---	---
Total.....	100,363	95,007	117,382	105,592	123,734	114,796	138,775	157,695
U.S. percentage of total.....	95	96	84	90	82	83	82	91

In addition to tallow, whale oil, fish oil, coconut oil, and rice-bran oil are used in Japanese soap. In the prewar period, fish oil was the major raw material. The present rate of industrial use of tallow will probably continue, but the steep upward trend is probably over for the most part, with most of the increase in demand being taken up by synthetic detergents. Some small quantities of inedible tallow are refined and consumed for edible use, but most tallow imported from the United States is used for soap manufacture.

### Paint and Protective Coating Industry

The consumption of drying oils is rising in Japan, along with the increase in the national consumption of paint and protective coatings. The main oils used are linseed, castor, and tung. It is expected that vegetable drying oils will more than maintain their present position in this industry. Some soybean oil is also used in paints--an estimated 3,000 tons per year.

In 1959, production of paint and protective coatings in Japan (267,518 metric tons) was about three times the 1952 level. Furthermore, 235,047 tons were produced in January-September 1960. As a result the consumption of linseed, castor, perilla, tung, and other industrial oils nearly doubled in 1959. Safflower oil, which is generally used as an edible oil in Japan and as a drying oil in the United States, may be made available for Japan's coating industries in the future.

The paint industry, of course, is following the industrial prosperity now going on in Japan, and demand is rising with industrial output. However, the development of synthetic or non-oil-base paints is cutting into the demand for drying oils. Further adverse factors appear to stem from the fact that the raw materials required for the manufacture of synthetic paints generally can be procured locally while most of the drying oils must be manufactured from imported oilseeds. Japan's domestic flaxseed production is relatively limited. In 1955, oil-base paints and varnishes made up considerably more than half of the volume of production.

### DOMESTIC PRODUCTION OF OILSEEDS AND OIL-BEARING MATERIALS

The agricultural policy of Japan aims, among other things, at increasing the supply of domestic farm products, including oilseeds, mainly soybeans and rapeseed, and at equalizing the economic position of the farming population with that of the nonfarming population. To achieve these objectives the government has regulated foreign trade and industry. For oilseeds, the government has the authority to restrict or prohibit their importation or to require importers, sellers, or processors to purchase domestic oilseeds when they are higher priced than imported oilseeds. Even though soybeans were put in the Automatic Approval category on July 1, this policy for domestic agriculture and oilseeds production still exists, and it is believed that the contributions from the present tariff system will be sufficient to maintain a prosperous domestic agriculture.

Japanese soybean production, which is now showing a slight downward trend, has not increased much in acreage or quantity in the past 50 years. Only area changes have been made, as the commercial crop has been increasing in the northern areas. This trend has led to the further reappraisal of oilseed production and an increase in research funds for the development of Japan's oilseed crops has been noticeable.

One of the reasons why the importation of American soybeans was not liberalized earlier in Japan was the fact that the Japanese Government is committed to supporting domestic production of soybeans and rapeseed to maintain farmers' incomes. Furthermore, the Ministry of Agriculture and Forestry has taken the position that imported

TABLE 17.--Oilseeds: Acreage, yield, and production, Japan, crop years 1957-61<sup>1</sup>

Crop	Acreage			Yield per acre					Production						
	1957	1958	1959	1960 <sup>2</sup>	1961 <sup>3</sup>	1957	1958	1959	1960 <sup>2</sup>	1961 <sup>3</sup>	1957	1958	1959	1960 <sup>2</sup>	1961 <sup>3</sup>
Edible use:															
Soybeans.....	898,800	856,200	836,681	758,350	740,800	1,125	1,007	1,123	1,214	1,160	458,500	391,200	426,200	417,600	390,000
Rapeseed and mustardseed.....	639,100	556,500	465,042	472,950	498,648	987	1,057	1,242	1,229	1,176	286,200	266,900	261,900	263,600	266,000
Peanuts (shelled).	97,900	108,300	106,006	135,263	148,754	1,130	1,187	1,368	1,435	1,383	50,200	58,300	65,800	88,060	93,300
Sesame.....	21,100	21,300	20,509	19,966	19,274	533	512	526	582	554	5,100	4,950	4,890	5,270	4,840
Cottonseed.....	4 3,240	4 2,790	4 2,718	4 1,804	4 1,483	136	142	146	111	134	200	180	180	91	90
Industrial use:															
Flaxseed.....	39,470	35,300	30,146	30,146	30,146	207	252	274	317	317	3,710	4,030	3,740	4,330	433.6
Total <sup>5</sup> .....	1,696,370	1,577,600	1,458,384	1,418,479	1,439,105						804,110	725,560	762,710	778,951	758,560

<sup>1</sup> Japan also produces rice bran (from around 8,150,000 acres of rice grown, 600,000-625,000 tons of rice bran are produced each year--production in 1961 is estimated at 643,000 tons--of which an estimated 225,352 tons of bran were extracted for oil in 1960, 185,148 tons in 1959, and 144,718 tons in 1958), tung nuts (about 600 tons each year), and other small volumes of oilseeds and tree nuts that are crushed for oil.

<sup>2</sup> Estimated.

<sup>3</sup> Forecast preliminary.

<sup>4</sup> Cotton.

<sup>5</sup> Not including cotton acreage.

Japanese Ministry of Agriculture and Forestry and other official sources.



soybeans should make up for the losses incurred under the government's price support programs for oilseeds.

Japan's domestic oilseed crops are expected to continue downward in 1961 to about the same low level as 1958. Soybean and sesame production will probably be down, but rapeseed and mustard and peanuts will be up only slightly. Soybeans are Japan's major oilseed crop, but the 1961 soybean production is expected to be down 7 percent. The crop is forecast tentatively at 390,000 metric tons, with a 2 percent reduction to 740,800 acres. Yields are forecast at somewhat below the high level obtained in 1960, which was about 10 percent above that of 1959 (table 17). Soybean acreage has continued downward since 1954, with the 1960 acreage down nearly one-fourth below the 1950-55 average of slightly over 1 million acres. There has been a 10 percent increase in acreage in Hokkaido, but this increase has been offset by decreased acreages in other areas.

Domestic soybeans generally are used directly in manufacturing food products as well as for home-made food products. They have only recently come into competition with imported soybeans which, for the most part, have been crushed for oil with part of the meal being used for food products.

The 1961 crop of rapeseed and mustardseed, Japan's most important domestic sources of edible vegetable oil, has been set at 266,000 metric tons, slightly above the 1959 and 1960 crops. Acreage was increased slightly during the winter, and yields are expected to remain relatively high. Growing conditions during both 1959 and 1960 were better than average. In 1958, production declined for the second season as a result of unseasonably cold weather and reduced acreage. In 1959 and 1960, the acreage planted was also reduced significantly and has not yet returned to the 1957 high level.

## Soybeans

Hokkaido, Japan's northern island, which has a climate comparable to northern Minnesota, has over one-fifth of the total soybean planted area. And, although in several past years it has suffered severe crop damage from adverse weather, over one-fourth of total soybean production and over half of the commercially marketed crop usually comes from there. Production in Hokkaido in 1960 was around 105,200 metric tons compared with Japan's total production of 417,600 tons. In most of the other areas of Japan, soybeans are grown for home or local consumption, mainly on dikes or back areas or in interplanted border strips between rice fields.

At the present time, 90 percent of the soybeans grown on Hokkaido are small (less than 250 grams per 1,000 grains) yellow varieties. One large variety, the Akita, which accounts for 9 percent of production, is in demand for miso processing, although it, like all Hokkaido's soybeans, has a dark hilum, or spot, which detracts from its desirability in miso. In addition, the oil content of Hokkaido's soybeans--and Japanese soybeans in general--is low, around 15 percent compared with 18-19 percent for U.S. soybeans. For this reason, the oil crushing mills seldom crush them. And as a result, most of the commercial crop in Japan is used for food purposes. In fact, considerable improvement in both oil and protein content of Japanese soybeans would create a greater demand for them. Naturally, with these present disadvantages, the marketing of Hokkaido soybeans by the farmers' cooperative (HOUKREN) without the help of the Japanese Government would be a difficult job.

Many agriculturalists in Japan expect to see an increase in soybean production, but the yields of around 1,320 pounds per acre in Hokkaido and less in other areas indicate that improvement in farming practices and considerable variety development are needed before production increases can be expected. Alternative crops for soybeans are mainly other beans. However, soybeans fit in well with the Japanese farm rotations, which

include sugar beets, potatoes, corn, and grassland. At the present time an upward trend in the production of soybeans appears doubtful, but research is making considerable progress. Meanwhile, producers will be faced with low-cost soybeans from the United States.

Hokkaido's 1960 commercial soybean crop marketed through the cooperative increased about 10 percent over the previous year, and totaled about 1.3 million bags (60 kilograms, or 132 pounds), or 78,800 tons, compared with 68,600 tons in 1959. Added percentages of soybeans were marketed off the farm as a result of the government's high price support program for soybeans. About one-fourth of Hokkaido's soybeans are consumed locally for food, and the balance is sold on Honshu for food uses.

If world soybean prices increase significantly, production and acreage of soybeans in northern Japan could very well reverse the downward trend that has occurred since 1957 in the commercial areas of Hokkaido and northern Honshu.

In Aomori, where a yellow miso soybean has been produced, the acreage trend has been upward in recent years. There are some indications, however, that production of soybeans in Hokkaido, contrary to other areas, could continue to increase as it did in the postwar years. For one thing, Japanese farmers in this area like to grow soybeans because they not only provide a food crop but also a profitable cash crop, and as long as the Japanese Government's Ministry of Agriculture and Forestry stands ready to take measures for the disposal of the crop at high prices these farmers will continue to grow soybeans.

In the northern areas, soybeans are planted around the middle to the end of May, and they are harvested from the middle of September to the middle of October. This fits in well with the short season in Hokkaido. The annual mean temperature in the main soybean areas is around 42° F., and the annual growing season is only 120-150 days. Unlike the combine harvesting in the United States, Japanese farmers gather the soybeans in the field as they do rice by hand cutting and threshing them in small machines that are either operated in the farm yard or in the fields. Yields of soybeans in Tokachi and Abashiri Districts of Hokkaido, two of the main commercial areas, have been substantially greater than in the prewar years, but production in these districts has been about the same.

### Farm Income and Management

Soybeans are a good income producer for farmers, but only because the government is supporting soybean prices about one-fifth to one-fourth above the free world price. The breeding of improved high-yielding varieties for northern Japan has shown considerable promise. Successful adoption of these varieties to commercial production should allow for some reduction of the high-supported domestic prices and bring them more in line with world levels. Furthermore, improvement in quality in Hokkaido soybeans may make it possible to establish a premium for improved quality in future years.

Soybean farmers, like others in Japan, obtain a relatively high level of income from a small land area; the average farm for all Japan is around 2 acres. These farms are about half the size of those found in primitive peanut farming areas of Africa, but through intense application of improved techniques and pure ambition, the Japanese farmer has increased his income far above those of other areas. But his costs are high too.

In 1960 in the Tokachi sub-Prefecture of Hokkaido, where most of the commercial soybeans are grown and where the average farm is considerably larger than in other areas of Japan, soybean farmers must expend \$65.75 to produce an acre of soybeans.

TABLE 18.--Soybeans: Estimated farm production costs and returns per acre, Hokkaido Prefecture compared with Illinois and Mississippi, 1958

Item	Unit	Hokkaido	Illinois	Mississippi
Average acres per farm in soybeans.....	Acres	<sup>1</sup> 6.3	50.1	<sup>2</sup> 200
Gross receipts:				
Bushels per acre.....	Bushel	22.5	31.6	23
Gross income <sup>3</sup> .....	Dollar	82.18	65.53	48.30
Cost and returns per acre:				
Operating:				
Labor cost.....	Dol. per acre	13.60	5.82	3.70
Seed.....	....do.....	3.17	2.25	3.60
Fertilizer and soil improvement.....	....do.....	9.26	4.01	---
Insect diseases and control.....	....do.....	.27	---	---
Draft animals.....	....do.....	7.37	---	---
Implements; other equipment.....	....do.....	3.34	5.80	1.64
Machinery.....	....do.....	---	3.95	3.81
Combine charges		{ 11.86	{ 1.40	{ .46
Crop expense - including hauling.....	....do.....			
Total.....		48.87	23.23	14.45
Fixed and general:				
Taxes.....	....do.....	9.59	4.44	---
Interest.....	....do.....	1.78	14.06	---
Land rent.....	....do.....	---	---	---
Buildings.....	....do.....	.97	1.47	---
Overhead equipment.....	....do.....	---	---	7.85
Interest on stored grain.....	....do.....	---	1.64	---
General farm expense.....	....do.....	---	2.74	---
Total.....	....do.....	12.34	24.35	7.85
Total cost of production.....	....do.....	61.21	47.58	22.30
Returns to producer.....	....do.....	20.97	17.95	<sup>4</sup> 26.00
Cost per bushel.....	Dol. per bu.	2.72	1.50	---
Net returns per bushel.....	....do.....	.93	.57	---

<sup>1</sup> Average size farm in Tocachi area - 25 acres. Estimate planted in soybeans around 25 percent. <sup>2</sup> Average of 18,000 acres on 65 farms. <sup>3</sup> 1958 prices. <sup>4</sup> Returns for land, management, and general overhead.

"Detailed cost report of heavy till soils, central Illinois, 1958," AER-R-32, Agr. Exp. Sta., U. of Ill., College of Agriculture, Urbana, Ill., April 1960.

May 1960 "Production Practices, Costs and Returns for Major Enterprises on Rice Farms in the Delta Area of Mississippi," Bul. 595. Miss. State Univ., Agr. Exp. Sta. State College, Miss., May 1960.

With an average yield of 23.6 bushels to an acre this is equivalent to around \$2.79 per bushel that the farmer must receive to pay his costs including farm labor. With returns based on a government support price of around \$3.36 to \$3.65 per bushel, depending upon quality, a Japanese farmer would earn a profit of \$13.60 to \$20.97 per acre. This can be compared with the average per acre income of \$17.95 on large U.S. soybeans farms in Illinois that are marketing soybeans at free market prices.

What does this high cost of soybean production mean to the American farmer? It means that he would be making \$1.29 per bushel profit if world prices were at levels where his Japanese counterpart would be able to receive complete returns for his labor, fertilizer, seed, and other costs. Furthermore, world prices would have to increase somewhat before the Japanese farmer can compete on a free market (table 23).

## Research

Agronomic and farm research on soybeans is just getting a good start in Japan. Most work is on nematode control and soil and variety improvement.



In Hokkaido, considerable progress is being made at two adjacent research stations of the Central Government and the Hokkaido Prefecture Government, which have 45 trial stations. Here, research is being directed toward improving the varieties of soybeans grown. To offset the disadvantage of Hokkaido's small soybeans, researchers have developed several new varieties that, while still low in oil content, are larger in size and have higher protein content and a light hilum.

One of the new varieties showing considerable promise is the Toiku #96, which has not yet been released for general seeding. In field trials, this soybean has produced record yields in Hokkaido's cool weather and poor soil. Furthermore, it has done better under these conditions than imported U.S. varieties. Under the ideal conditions provided at the research stations, yields have been more than double those in the field.

Researchers say that, with Toiku #96 and other new varieties, there is considerable promise for increasing Hokkaido's soybean yields from 10 percent to 20 percent in the next 5 to 10 years. They believe that, if favorable weather conditions continue, as in the past several years, the production of commercial soybeans in this area should increase this much. This, in turn, should help to maintain farm incomes in face of any reverses in prices. Bad weather conditions often cause heavy losses to soybean growers in Hokkaido.

The Japanese Ministry of Agriculture and Forestry recently announced the development of eight new varieties of domestic soybeans, many of which have white hilum and are suitable for both misu and tofu production. Four of these varieties are suitable for cultivation in Hokkaido:

The Nagaha Jiro, with a slightly higher oil content, to be substituted for the Tokachi Nagaha and Maru Kotsubu varieties, and expected to be planted on 25,000 acres;

Shinsei, which has the highest oil content of any Hokkaido soybeans but still below U.S. varieties, and is expected to be planted on 50,000 acres and to take the place of the Suzunari variety;

Kogane Jiro, which is suitable for tofu and grown with the Kitami Shiro variety in Tokachi area, with an expected 50,000 acres to be planted; and

Tokachi Shiro, also suitable for tofu production, and is expected to be planted on 50,000 acres.

The four other recently developed varieties are the Nemashirazu, with excellent quality for tofu and to be planted on 15,000 acres in Yamagata, Iwate, Miyagi, Fukushima, and Nagano Prefectures; Bonminori, which is expected to be grown on 6,000 acres in Mie and Yamanashi Prefectures; Oku Mejiro, which is expected to be grown on 12,500 acres in Fukushima Prefecture; and Fujimusume, with a white hilum, big seeds, and a high oil content, and is expected to be grown on 5,000 acres in Shizuoka and Wakayama Prefectures.

Soil research is important in Japan's northern soybean areas, where the soils are generally poor and there is a great need to improve them to increase production. In the main soybean growing areas of Hokkaido's Tokachi district the soils appear black on top as a result of the application of peat, but the top soils are less than a foot deep in most areas. Furthermore, heavy plows cannot be used. The average farm is around 20 acres, about double the Hokkaido average of 12.2 acres (8.5 of which are cultivated) and 10 times the national average. The common tractor being adopted in the areas is the small "Fordson" type of which there are around 1,250 in use at present. These tractors, of course, do not turn the soil very deep. The soil types found in the north are about one-third volcanogenous, one-fifth heavy clay, one-tenth peat and acid soils, with the balance made up of ordinary and damp soils.

Some poor farming practices can be found in Hokkaido's main soybean areas. Here, farmers grow the soybean crop on their poorest soil in competition with other beans and reserve their best soil for sugar beets and potatoes. The Tokachi area's volcanic soil is seriously deficient in nitrogen and magnesium, but very little chemical fertilizer is used. Soil-improving crop rotation practices have been developed by the research station, but they are not usually followed by farmers.

Research personnel in the Tokachi area are producing two to three times more soybeans per acre than are the farmers in the surrounding areas with the same type of soil. However, the experiment station uses appropriate fertilizer practices which the farmers consider too costly. It has been estimated that the average yield of soybeans on Tokachi farms could easily be increased by at least 50 percent if only a part of the experiment station's recommendations were followed. If this was done, Japan's soybean producers could make a start toward competing in price with imported soybeans and thus eliminate the costly price support program on this crop.

## Rapeseed

Rapeseed is Japan's most important oilseed used solely for crushing, and it is grown in nearly all parts of the country. The area planted to this crop has more than doubled in the last 25 years as a result of the increase in demand for edible rapeseed oil. Japan's production of rapeseed in 1960 has been estimated at around 263,600 metric tons, of which 100,900 tons (two-fifths) are produced on Kyushu, where it is grown as a winter crop on rice paddies and in competition with wheat and other winter cereals. The main production areas in Kyushu are Kagoshima and Fukuoka, which produce about half of the island's total and around one-fifth of the nation's production. Other important rapeseed production Prefectures are Aomori, Hokkaido, Fukushima, and Ibaraki in the spring rapeseed area and Aichi, Mie, and Shiga in the winter, or second crop, area on Honshu.

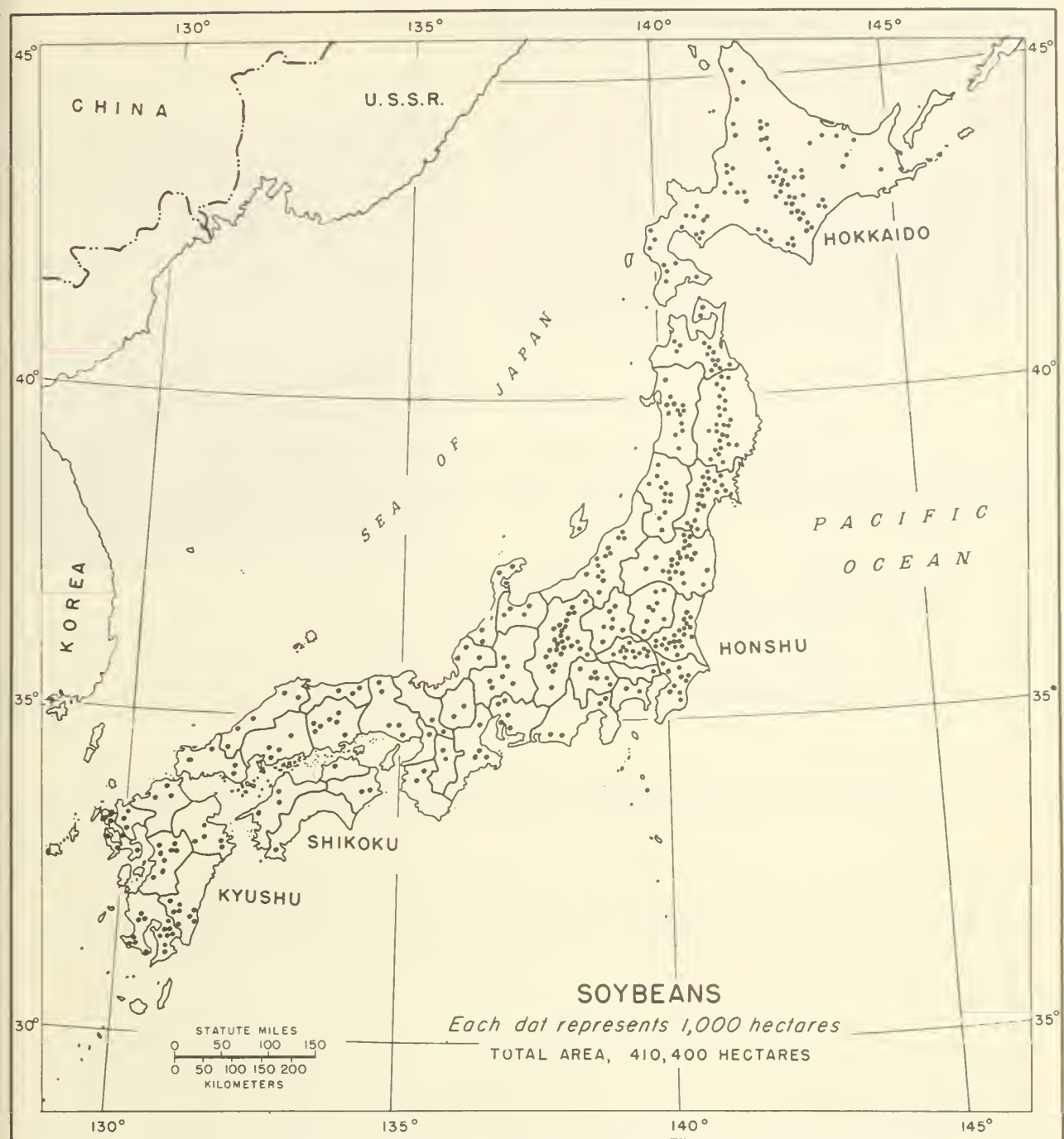
Spring rapeseed in the northern areas has an average of around 3 percent higher oil content and 1 percent higher moisture content than the seed produced in the southern, or winter crop, areas. These factors have been taken into account in the grading system that has been established for rapeseed. Unlike soybeans, rapeseed is graded on the basis of oil content, with four major grades providing for evaluation of oil content ranging from 33 percent to 42 percent.

Oil content of rapeseed varies considerably, and both Hokkaido and Canadian rapeseed processed in Japan has been found to have 41 percent to 43 percent oil content, while the rapeseed from Fukuoka Prefecture on Kyushu has only 38 percent to 39 percent.

In the main production areas of southern Japan on Kyushu, 97 percent of the rapeseed is planted as a second crop on rice paddies. About 20 percent of the rice paddies are planted with rapeseed but, since wheat planting is controlled by the government, wheat accounts for over 60 percent of the total winter crops planted. Nevertheless, rapeseed is an excellent crop for the rotation system of 2 years' wheat and 1 year for rapeseed. It also produces more income than wheat, but labor requirements are greater.

Continuous planting has reduced yields in the winter crop areas. Nevertheless, rapeseed yields often compare quite favorably with the higher yields in the one-crop areas of northern Japan and average four-fifths to one-half of the latter.

In the winter production areas of Kyushu, rapeseed is sown in the nursery beds from mid-September to mid-October, and the young plants are transplanted in the paddy fields from the middle to the end of December. The seed is harvested at the end of May and early June, just prior to the plowing and fertilizing for transplanting rice. Some rapeseed, however, is now being sown directly in the fields in October as one of the improved



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methods being studied for eliminating the large amount of hand labor necessary for transplanting. In wet paddy fields the seed and seedlings are planted on high ridges that are built up to allow drainage.

In northern Japan, both Hokkaido and Aomori had a good crop of rapeseed during 1960, amounting to a total of around 20,000 and 27,500 tons, respectively. In these northern Prefectures, about one-fifth of the rapeseed crop is grown. Here, rape is a summer crop planted on upland areas. The crop is sown in May and June and harvested in August and September. However, further expansion of northern rapeseed acreage is not expected because production of sugar beets has become more profitable. Furthermore, it is expected that with the liberalization of soybeans, the price of oilseeds in general will be lowered. But present price trends do not indicate this situation will exist.

The price in 1960 for rapeseed in Hokkaido was around 3,700 yen per 60 kilograms (\$4.60 per bushel) compared with 2,794 yen (\$3.52 per bushel) for imported soybeans. At this price level, which is the free market price, two Hokkaido oil crushers have reported a preference for rapeseed because of its higher oil content.

Last year the price of rapeseed was supported by the government at 4,000 to 4,600 yen per 60 kilograms (\$5.00-\$5.75 per bushel); as a result there was an imbalance in demand and supply. Japanese rapeseed sells \$0.40-\$1.15 per bushel above world price levels.

Hokkaido's rapeseed acreage in 1960 was estimated at 29,650 acres, which was double that of 1952, but below the high 1957 level. Acreage in Aomori, in northern Honshu, was nearly double the 1956 level. Oilseed crushers prefer rapeseed from these northern areas over that from the commercial production areas of the south because of the higher oil content. This has been an important factor in the expansion of this crop in the northern part of Japan. On the other hand, wheat is now less competitive in the winter paddy fields of the south, and some expansion in production could possibly occur here.

TABLE 19.--Rapeseed: Estimated average production costs per acre compared with wheat, Japan, 1960

Cost item	Rapeseed	Wheat
Operating:	<i>Dol. per acre</i>	<i>Dol. per acre</i>
Labor <sup>1</sup> .....	54.24	57.33
Seeds and seedlings.....	.22	3.14
Fertilizer <sup>2</sup> .....	36.18	33.12
Miscellaneous materials.....	.51	1.46
Spraying and disease control.....	.23	.14
Implements.....	2.90	7.06
Draft animals.....	9.86	9.40
Other.....	3.27	6.53
Total.....	107.41	118.18
Fixed and general:		
Buildings.....	1.68	3.59
Capital interest.....	3.78	6.13
Rent.....	4.43	4.05
Taxes.....	7.15	5.92
Total.....	\$17.04	\$19.69
Total cost of production.....	\$124.45	\$137.87

<sup>1</sup> Economic value of farm labor.

<sup>2</sup> Economic value of home-made manure and night soil.

Statistics and Survey Division, Ministry of Agriculture, and estimates of Fukuoka Prefecture, Department of Agriculture.





Above, snow-capped Mt. Fuji looks down on harvested rice fields that will be planted to rape in winter. Farmer turns under rice stubble, preparatory to planting rape. Rapeseed is Japan's most important oilseed for crushing, and it is grown in nearly all sections of the country.

### Farm Costs

The farm costs of producing rapeseed are relatively high in the commercial areas of Japan--very close to wheat production costs.

Using local costs in the Kyushu area for labor, fertilizer (night soil and manure), chemical fertilizers (only a very small amount is used), seeds and seedlings, water use, and overhead, cost of production is almost double the cost of producing soybeans (table 19).

The price of wheat in 1960 in the southern areas was supported by the government but not the rapeseed price. However, rapeseed was marketed by the farmers' cooperative (Agricultural Cooperative Association) Nogyo-Kyodo-Kumiai. Actual sales are made by the National Marketing Cooperative, Zenhanren.

Farmers harvest rapeseed by hand, thresh it with small portable machines, and bag the rapeseed on the farm. In some areas the machine used for threshing rice is also used for rapeseed. In other areas, special machines are used. Rapeseed is sold to the cooperative for an estimated price, and after the final sales are made by Zenhanren the final adjustment in price is made with the farmers. The cooperatives make an estimate of production and from this the original price is established, which is approximately 80 percent of the estimated value. If a farmer needs money prior to harvest, loans at 60 percent of estimated value are allowed any time before harvest. Settlement is made at the end of the season when the farmers are paid the balance of their income. The rapeseed is sold to the crushers on a basis of bid price.

### Farm Management and Income

In the big rapeseed-producing area--Kyushu--the average-size farm is 0.6 hectare, or 1.73 acres. In Kyushu's Fukuoka Prefecture, there are 97,000 hectares of cultivated land and 112,000 farms. The agricultural land law has restricted the size of farms in this

area by allowing only a maximum of 2.5 hectares, or 6.18 acres. However, many rapeseed farms are less than 0.3 hectare in size, and income is so low that work must be obtained off the farm.

Many of the rapeseed farms use horses and cows to cultivate and plow, but the use of small powered tractors and tillers is increasing. While rice is the main crop in the rapeseed production areas, the dairy industry is growing. This accounts for the increasing number of cows used for farming purposes.

On Kyushu the average farm income is around 260,000 yen per family (\$722). Rice income is equal to 140,000 to 150,000 yen (\$389-\$417). The balance of 120,000 yen (\$333) is obtained from such winter crops as rapeseed, wheat, and vegetables. This extra winter income is not available to the Hokkaido farmer; this is one of the reasons why the government is pushing for a joint livestock-crop farm enterprise in this area.

### Research

Several new varieties of rapeseed have been developed for the southern areas to improve yields and oil content. Also, fertilizer studies have been adopted that provide for applications as follows: One-third in October, one-third in February, and one-third in April. Other farming practices are being studied to control diseases and nematodes.

Although the oil content of rapeseed varies from year to year because of weather conditions, important steps have been made toward developing a variety that has a higher average oil content. One improved variety being introduced, the Aburamasari, has an average oil content, of 43 to 45 percent when grown in the Kyushu areas. In Fukuoka its oil content has been around 46.5 percent and Kagoshima, 49 percent.

Norin 14 is the usual variety planted in the southern areas; another variety, Norin 17, which has a higher oil content, is now being planted. Nevertheless, the Aburamasari variety, which will soon be available to farmers, will not only provide increased yields and higher oil content but it will be resistant to the shirosabi disease now reducing yields. This new variety was selected in 1956 after a development period extending over 20 years. The usual time to develop a new variety is about 10 years.

Also, research studies have been conducted on direct sowing versus transplanting. It was found that if seed is sown by October 25, it will give the same yields as is obtained from transplanting method. As a result of these studies, around 15 percent of the rapeseed in the Fukuoka area is now being sown, which has meant a great saving in labor.

### Other Oilseeds

During 1961 about 30,000 acres of flaxseed was planted in Japan. By far the largest area planted--about two-thirds--is in Hokkaido. Flaxseed is well suited to the cultivation conditions, cold climate, and soil found in Hokkaido. Here, flaxseed is grown in the same districts as soybeans, mainly Togachi and Abashiri.

Yields of flaxseed in Hokkaido are low and average around 5 bushels or less per acre (table 17).

Sesame seed is an important oilseed crop in Japan, and peanuts are grown for edible consumption rather than crushing. These crops are found in many areas. Also a small volume of cottonseed is produced from the declining cotton crop found in the southern areas.

## Rice Bran

Over 600,000 tons of rice bran are produced each year in Japan but, because of the wide distribution of rice production, bran is not available in large enough quantities in many areas to support an economical oil-extraction industry. As a result, much of the bran is never properly utilized and, since it increases rapidly in free fatty acid content after being milled, it can be moved long distances and processed economically only where transportation is up to date.

The rice-bran processing industry, nevertheless, has been expanding, and the production of oil for both edible and industrial use in recent years is upward. A recent development has been the introduction of an improved quality of edible oil by modern solvent extraction techniques and improved refining. This technical development should increase the price of bran. Before modern transportation enabled crushers to move the bran to the mills shortly after production, most of the rice-bran oil was used for soap.

Rice bran contains around 18 to 20 percent oil, and the modern batch-solvent-extraction methods used can recover from 17.5 percent to 19.5 percent of it. Not only is the present processing method obtaining valuable oil, but the meal and cake are more useful for livestock and poultry feed and for fertilizer. Because of the need for quick movement of the bran soon after milling, most rice-bran oil mills in Japan maintain their own small fleet of trucks that have established routes with the many rice plants where they can obtain the bran immediately after milling.

Extracted rice bran is a valuable poultry feed, particularly for the production of eggs and broilers. Raw rice bran, on the other hand, adversely affects layers and it is considerably less valuable because of its usual high free fatty-acid content and lower protein value. Much of it is used for fertilizer. Furthermore, extracted rice-bran meal can be stored for a long period without any change in protein content. Rice-bran meal is high in phosphorus but low in calcium.

## Marine Oils, Including Whale

Japan has a well-developed fishing and whaling industry and, in recent years, Japanese whaling operations in the Antarctic have increased substantially. There is an abundance of aquatic resources around the homeland islands, and large quantities of several types of fish oils and fish meal are produced. However, over 80 percent of the whale oil produced is exported.

The production of fish oil in the 1960 fiscal year beginning April 1 is expected to reach 42,300 metric tons compared with 41,300 tons expected in 1961-62.

The production of whale oil is expected to increase over 20 percent in fiscal 1961-62--to around 128,000 tons. More whaling units have been added to the Antarctic fleet since the war. In 1959-60, Japan had 6 floating factories and 69 catcher boats in the Antarctic. Production in 1955 was only around 65,941 tons, or about half of the present production. While the Antarctic is the main source of whale oil, a sizable volume is obtained from the northern seas and some from the coastal seas. In 1941, whale oil production was around 102,000 tons, of which only 20,000 tons were exported.

Sperm whale oil will be about the same in the coming fiscal year as in the past. Sperm oil is used for the production of higher alcohol synthetic detergents in Japan. There is no problem with respect to this supply, for there is no restriction as to the number that can be caught as is the case for fin whales.



## Animal Fats

Japan has only a limited amount of land available for grazing and, as a result, the production of animal fats in the past has been almost negligible. However, with the present trends toward increasing livestock production, the production of animal fats is growing, but consumption of domestic tallow and grease is limited to the rural areas. On the other hand, an increase in the amount of butter is available to urban consumers, but at high prices compared to those for vegetable margarine.

Nearly all of the commercial fats used in Japan are obtained from foreign sources. However, the commercial hog slaughter in Japan has more than doubled over the 1951-55 average and, in 1960, 3,182,000 hogs were slaughtered. But lard production is low in Japan and only around 4,000 tons are produced at the present time. Present indications are that lard will continue to be imported in minor, but increasing, quantities and, because of the difficulty in collecting domestic lard for shipment, most of it will be used locally and on farms.

Butter production, which is increasing every year, is now around 10,000 tons a year but, as the consumption of fluid milk rises with the expansion of the livestock industry, only a small increase in butter production can be expected. Consumption of butter has never been important in Japan.

## FOREIGN TRADE

Japan's imports of oilseeds and oil-bearing materials reached 1,675,755 metric tons in 1960, slightly over the record 1.5 million tons in 1959 when imports of oilseeds were up one-fifth from the previous year and almost double the 1952-56 average.

TABLE 20.--Oilseeds and oil-bearing materials: Japan's imports, average 1952-56, annual 1957-61

Oilseeds	Average 1952-56	1957	1958	1959	1960	1961 forecast
<i>Edible:</i>	<i>Metric tons</i>	<i>Metric tons</i>	<i>Metric tons</i>	<i>Metric tons</i>	<i>Metric tons</i>	<i>Metric tons</i>
Soybeans.....	529,673	805,489	904,700	997,953	1,128,290	1,225,000
Cottonseed.....	45,973	44,244	81,450	117,442	71,349	100,000
Safflowerseed <sup>1</sup> .....	3,306	22,056	26,709	68,844	94,811	60,000
Kapokseed.....	13,420	22,661	26,286	34,957	34,548	33,160
Sesameseed.....	12,939	11,305	16,918	27,246	27,916	28,000
Rapeseed.....	6,179	---	16,667	26,113	50,592	55,000
Mustardseed.....	9,173	26,241	4,472	5,826	4,463	---
Peanuts (shelled).....	8,396	11,501	8,169	5,050	6,151	1,630
Hempseed.....	1,184	790	927	954	1,010	---
Nigerseed.....	---	---	---	2,992	12,324	---
Sunflowerseed.....	89	2,192	2,196	7,226	20,232	---
Other oilseeds, nuts, and kernels.....	8,860	898	311	1,594	3,584	23,000
<b>Total.....</b>	<b>639,192</b>	<b>947,377</b>	<b>1,088,805</b>	<b>1,296,197</b>	<b>1,455,270</b>	<b>1,525,790</b>
<i>Palm:</i>						
Copra.....	37,731	45,871	47,831	54,682	85,271	70,590
Palm kernels.....	10,742	27,729	32,231	33,825	30,373	37,260
<b>Total.....</b>	<b>48,473</b>	<b>73,600</b>	<b>80,062</b>	<b>88,507</b>	<b>115,644</b>	<b>107,850</b>
<i>Industrial:</i>						
Flaxseed.....	44,273	86,946	44,912	90,244	76,563	93,180
Castorbeans.....	21,117	22,269	21,596	27,200	27,419	29,680
Perillaseed.....	615	233	300	45	859	100
Other oilseeds.....	20	---	---	---	---	---
<b>Total.....</b>	<b>66,025</b>	<b>109,448</b>	<b>66,808</b>	<b>117,489</b>	<b>104,841</b>	<b>122,960</b>
<b>Total imports.....</b>	<b>753,690</b>	<b>1,130,425</b>	<b>1,235,675</b>	<b>1,502,193</b>	<b>1,675,755</b>	<b>1,756,600</b>

<sup>1</sup> Oil produced used also in industrial products.

Compiled from official and other sources.



TABLE 21.--Soybeans: Japan's imports, by country of origin, and U. S. share, averages 1935-39 and 1948-52, annual 1953-60

Country	Average 1935-39	Average 1948-52	1953	1954	1955	1956	1957	1958	1959	1960
	Metric tons	Metric tons	Metric tons	Metric tons	Metric tons	Metric tons	Metric tons	Metric tons	Metric tons	Metric tons
Argentina.....	--	--	--	141	--	--	--	--	--	--
Brazil.....	--	355	13,571	18,386	31,261	12,219	--	27,884	28,554	11,386
Burma.....	--	--	--	--	--	--	--	32	--	--
Cambodia, Laos, Vietnam.....	--	--	--	500	--	11	--	--	--	--
Canada.....	--	1,991	--	--	--	1,538	15	--	1,015	--
China, Mainland	616,710	32,675	24,320	45,864	203,522	165,790	199,657	89,197	--	147
Hong Kong.....	--	733	882	--	--	69	7	--	--	--
Kenya.....	--	--	--	--	--	76	--	199	6,478	--
Korea.....	134,970	--	--	--	<sup>1</sup> 1,141	--	--	--	1,174	--
Indonesia.....	--	1,372	--	--	--	102	--	--	--	--
Malaya.....	--	--	--	--	--	--	--	--	3,215	--
Nigeria.....	--	--	--	--	--	--	--	9,145	4,035	--
North Borneo..	--	--	--	--	--	--	--	--	102	--
Tanganyika....	--	--	--	--	--	197	--	--	1,889	--
Thailand.....	--	20	830	--	--	1,024	100	--	--	--
United States.	--	147,379	408,704	442,874	572,052	536,055	605,359	777,436	951,232	<sup>1</sup> 1,091,364
Uganda.....	--	--	--	--	--	--	51	242	259	--
Other.....	--	--	--	--	201	--	300	565	--	25,393
Total...	751,700	184,525	448,307	507,765	808,177	717,081	805,489	904,700	997,953	<sup>1</sup> 1,128,290
U.S. share....	Percent --	Percent 80	Percent 91	Percent 87	Percent 71	Percent 75	Percent 75	Percent 86	Percent 95	Percent 97

<sup>1</sup> U. S. shipments valued at \$102,959,369 compared with total import value of \$107,400,097.

Official and other sources.

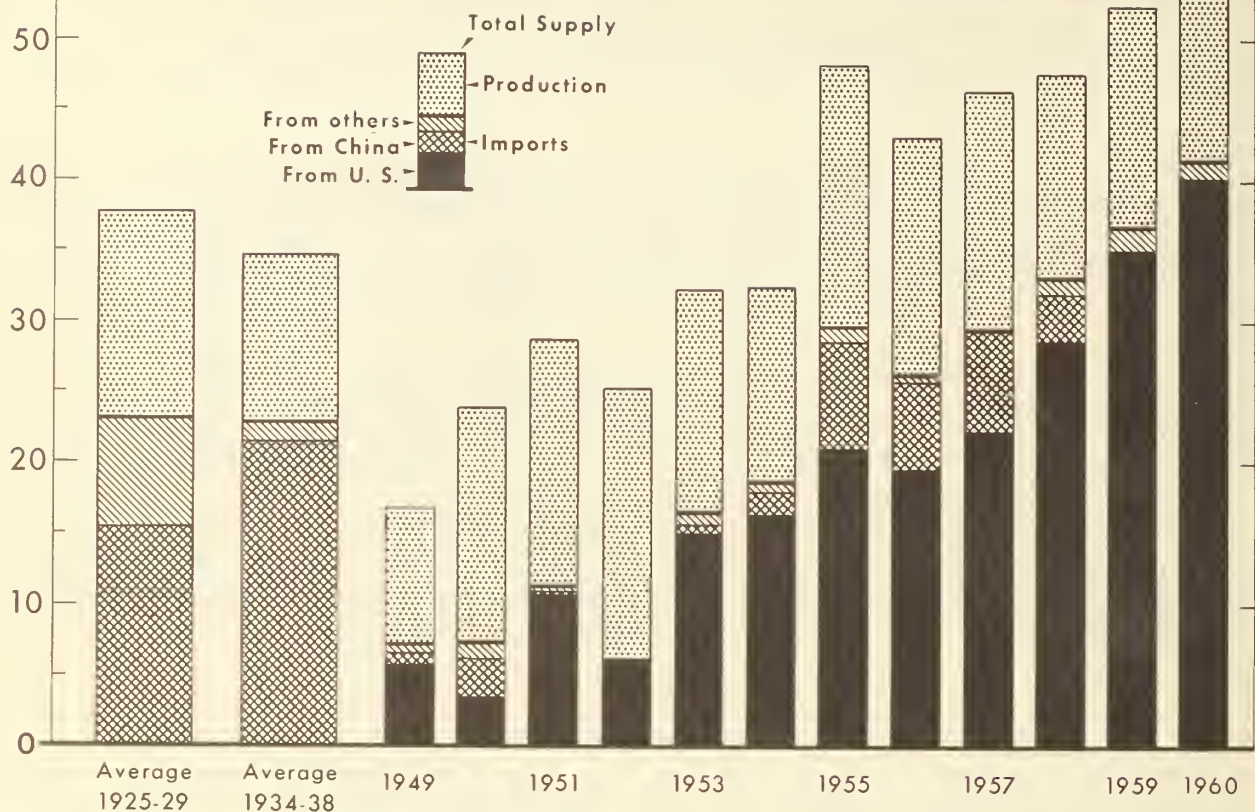
## Soybeans

Imports of soybeans reached a record 1,128,290 tons in calendar year 1960, up 13 percent over 1959. In fiscal 1961 (beginning April 1), Japan's soybean import requirements are estimated at 1,268,000 metric tons by the Japanese Ministry of Agriculture and Forestry, a 16-percent rise compared with 1960 planned purchases. This plan takes into consideration the liberalization of soybean imports on July 1. Many informed businessmen in the crushing and vegetable oil industry in Japan have expressed the opinion that imports may total more than 2 million metric tons in 1965, a 100-percent increase in 5 years. The projected 5-year trend, which is not unreasonable, would thus average at around 15 percent per year. The United States, as in the past, will no doubt, be in a position to supply the bulk of this increase in imports of soybeans in Japan. Further projections on this use by the crushing and vegetable oil industry combined with the present increase in the demand for feed in Japan, suggest that the immediate effect of soybean imports being under the Automatic Approval system would be a jump of nearly 25 percent the first full year of liberalization.

The United States supplied a record 1,091,364 tons (97 percent) of Japan's soybean imports in 1960 and 951,232 tons (95 percent) in 1959. Soybean imports made up about two-thirds of Japan's total oilseed imports during these years. Imports of this oilseed are expected to set another record in 1961.

Imports of soybeans from China and Brazil can be expected to increase in 1961, and trade reports indicate that as much as 100,000 tons may be obtained from Mainland China this year.

# Sources of Japan's Total Soybean Supplies



## Other Oilseeds

**Imports.**--Cottonseed was Japan's second most important oilseed obtained abroad in 1959, but safflowerseed took its place in 1960 as cottonseed imports fell off more than one-third. Imports of safflowerseed increased nearly 40 percent in 1960 from the previous year. Also, imports of rapeseed and nigerseed were at new highs in 1960. Copra was also up substantially from the previous year, but palm kernel imports fell slightly. Industrial oilseed arrivals were twice as high, with record imports of flaxseed and castorbeans in 1959, but 1960 imports of flaxseed fell 15 percent. Further record imports of soybeans, rapeseed, palm kernels, flaxseed, and castorbeans are expected in 1961; also cottonseed imports will be up. On the other hand, imports of copra and safflower are expected to fall somewhat.

Japan obtained over two-thirds of total oilseed imports from the United States during 1959 and 1960. And in addition to soybeans the United States supplied a significant volume of safflowerseed and flaxseed both years. Canada was the second major supplier of oilseeds, and was Japan's major source of flaxseed and rapeseed during the same period. Nicaragua was the major source of cottonseed, but imports from this country fell 50 percent in 1960. Thailand supplied Japan with large shipments of castorbeans and kapokseed as well as some cottonseed. Other countries supplying Japan with oilseeds were Nigeria--cottonseed, soybeans, sesame, and palm kernels; Indonesia--kapok, palm kernels, and copra; Brazil--soybeans; Malaya, palm kernels and copra; British North Borneo--copra; Sudan--cottonseed and sesame; Tanganyika--sesameseed and other oilseeds. Copra came also from many small central, western, and southern Pacific island groups.

**Exports.**--Exports of oilseeds from Japan are practically negligible; some edible soybeans and sesameseed are exported to several nearby Asian countries.

Total exports of fats and oils from Japan, however, have increased in recent years. Since Japan is a deficit area for vegetable and animal fats and oils, the country does not generally export large quantities of these products. However, exports of soybean oils in 1959 and 1960 were at record levels, and expected exports of oil, based on an allocated 100,000 tons of soybeans imported for this purpose, are programmed at near this level in 1961. Soybean oil crushers have reduced their export prices on soybean oil almost to the minimum, with the hope that they would receive soybeans as a reward for re-exporting oil. In 1959 and 1960, 24,972 and 21,776 metric tons, respectively, of soybean oil were exported compared with only 18,807 in 1958. Hong Kong is the largest market for Japanese soybean oil, taking two-thirds of the exports. Shipments to Hong Kong were 14,247 in 1960, 17,727 tons in 1959, and 10,371 tons in 1958. Other countries receiving soybean oil from Japan are Malaya, Singapore, the Philippines, the Netherlands, Malta, Egypt, Mauritania, Australia, New Zealand, and the Ryukyu Islands.

Very little, if any, other vegetable oils are exported from Japan, and only occasional shipments of coconut oil, rapeseed and mustard oil, sesame oil, and butter are made. The United States buys some sesame oil from Japan. Japan shipped some linseed oil to the Philippines in 1959; also, castor oil shipments were made to the United States that year. No shipments were made to these countries in 1960.

### Marine Oils

Marine oils, mainly whale oil, make up 80 percent of Japan's exports of fats and oils. The balance is made up mainly of soybean oil. The marine oil exports totaled around 84,500 metric tons in 1959 and 1960, but are expected to reach 111,000 tons in 1961. The principal export markets for Japanese whale oils are West Germany, the Netherlands, the United Kingdom, Czechoslovakia, and Egypt. In Western Europe, Japanese whale oil is in demand for use in the manufacture of margarine. Sperm oils are also shipped to the same areas of Western Europe and to the United States.

### Animal Fats

Animal fats imported into Japan include "Dutchlard," a refined grease product. This product has been used, to a limited extent, by the baking industry. However, it is used mainly by the Chinese restaurants in Japan for cooking purposes. Beef tallow is the main fat or oil imported as such and, in 1959, imports of tallow for the soap industry made up nearly 80 percent of the total imports. Most of this was obtained from the United States (table 16).

### Oilcake and Meal

Imports of soybean meal in 1961 may be large, and most of them are expected to originate in the United States. These imports are made by the government; the actual volume will depend on the supply and demand situation. Imports of cake and meal in previous years were considerably below this level (table 4).

Exports have averaged around 20,000 tons in the past 2 years. They were composed mainly of shipments of soybean cake to the Ryukyus and other oilseed cakes and meals to West Germany, the Netherlands, and Denmark.

### Trade Controls

Japanese control of foreign trade in oilseeds, oil-bearing materials, and fats and oils is based on two factors of the economy other than exchange control: Protection of domestic agriculture, and protection of the domestic fats and oils industries. The high production costs in domestic agriculture indicate the need for some kind of protection to Japanese



oilseed farmers. Moreover, Japanese crushers and the fats and oils industry do not want semiprocessed or processed commodities. They, of course, prefer to import raw materials, such as oilseeds, to utilize their facilities and maintain their labor force and other factors of production as efficiently as possible. As a result of this policy, Japan has developed a large market for U.S. oilseeds and other raw materials, such as tallow and grease, but only a small market for processed vegetable oils.

The importance of maintaining and expanding this growing market for U.S. oilseeds and fats and oils is of great concern to American agriculture. As a result of its technical position in processing, Japan's fats and oils industry is now in a position to comb the market for oilseed supplies that offer the best trade opportunity. This means, of course, more competition for U.S. oilseeds in this market.

Trade controls through import duties as well as exchange controls are exercised in Japan. Import duties are relatively high for most vegetable oils, while the raw materials move into Japan at much lower rates or on a free basis. For example, the import duties on soybeans is 10 percent ad valorem<sup>1</sup> and on soybean oil, 20 percent; on peanuts it is 10 percent, but on peanut oil, 20 percent; the tallow duty is 5 percent and 10 percent, while the tariff on stearic and oleic acid is 15 percent. Soaps and artificial lard and other fats and oils products also carry high rates compared to raw material rates.

During 1960 the Japanese Government linked domestic soybean sales to the allocation of exchange for the import of dollar area soybeans. Foreign currency for soybean imports was allocated only to those processors or consumers who purchased the domestic soybeans in stock under the conditions and prices stipulated by the government. The ratio used was six foreign imports to one purchase of domestic soybeans.

The stock of domestic soybeans held by Zenhanren (the agricultural cooperative buying organization designated by the government for soybeans) totaled over 29,000 tons in June 1960. Under this system, most of these soybeans were moved into trade channels. The purchase price was set at around \$4.50 per bushel equivalent in yen per 60-kilogram (132.3 pound) bag, free on rail in the producing area. The marketings of these soybeans were divided 69 percent to the oilseed crushers and 31 percent to the food processors. Foreign currency allocation coupons were issued to soybean users agreeing to purchase domestic soybeans. The Japanese soybean crushers and food processors were reportedly bearing the cost of maintaining the high price supports for domestic soybeans at the rate of around 60 to 75 cents per bushel equivalent. These sales were around \$1.00 higher than imported soybeans c.i.f., Japan.

Regardless of the controls over soybeans from dollar areas, allocation of funds have been made available for imports from these areas, and there has been little improvement in the trade from other countries allowed to send in soybeans under the Automatic Approval system. Japanese imports of soybeans from the United States during 1960 and early 1961 before U.S. soybeans were on the AA list continued at an increasingly high rate. Although liberally applied, it appears that controls were retained as a policy factor for maintaining sales of relatively high-priced domestic soybeans.

It is recognized that the Japanese Ministry of Agriculture and Forestry is facing a grave problem in maintaining high prices for domestic high-cost soybeans. It is also recognized that, at the present 10 percent tariff rate, the Japanese Government is collecting over 25 cents per bushel on the import of nearly 40 million bushels of U.S. soybeans, or a total of around \$10 million. This is equivalent to around \$1.35 for each bushel of the 7.3-million-bushel commercial domestic crop--an amount sufficient to more than pay the difference between domestic and import prices of soybeans. American soybeans, thus, are providing sufficient revenue to support prices for both domestic rapeseed and soybeans. Many observers feel that exchange or trade controls are no longer necessary in Japan. The country's dollar position has improved significantly in the past 3 years, and, if the Diet increases the import duty on soybeans from 10 percent to 13 percent, this should not

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<sup>1</sup> The import duties on soybeans for feed is suspended.



TABLE 22.--Oilseeds, fats, and oils: Import tariff rates, Japan, as of Dec. 31, 1960<sup>1</sup>

Oilseeds and vegetable oils	Rate on--	
	Oilseed	Oil
Edible:	Percent ad valorem	Percent ad valorem
Soybean.....	<sup>1</sup> 10	20
Cottonseed.....	Free	10
Hempseed.....	Free	
Mustard.....	5	15
Kapok.....	Free	
Niger.....	Free	
Peanut (shelled & unshelled).....	10	20
Rapeseed.....	5	15
Safflower.....	<sup>2</sup> Free	
Sesame.....	Free	
Other oilseed (and oils).....	Free	<sup>3</sup> 15
Olive oil.....	--	Free
Corn.....	--	15
Palm:		
Copra (coconut oil).....	Free	10
Palm kernel.....	Free	15
Palm.....	--	10
Industrial:		
Flaxseed (linseed oil).....	Free	10
Castorbeans (castor oil).....	Free	10
Perilla.....	Free	
Tung nuts (tung oil).....	Free	Free
Oiticica.....	--	Free
Animal fats & oils and fatty products:		
Tallow.....	10	No change
Beef tallow.....	5	<sup>4</sup> No change
Stearic acid.....	15	No change
Oleic acid.....	15	No change
Fats and oils products:		
Lard.....	5	<sup>5</sup> 5
Shortening.....	Free	15
Artificial lard.....	10	No change
Other oil fat or wax products.....	20	No change
Soaps:		
Scented product (toilet).....	30	27
Other (laundry).....	20	20
Other related products:		
Soybean meal.....	5	No change
Rice bran.....	Free	No change
Other oil meals.....	Free	No change

<sup>1</sup> Under GATT negotiations, soybeans will be bound at 13 percent. The new rate will not go into effect until after it is approved by the Japanese Diet. Imports of this commodity were liberalized by placing them under the automatic licensing system July 1, 1961.

<sup>2</sup> Safflowerseed will be removed from a free rate and placed under a 5 percent duty rate under present negotiations.

<sup>3</sup> Including hardened or hydrogenated oil.

<sup>4</sup> Beef tallow will be reduced from 5 percent to 4 percent.

<sup>5</sup> Lard, which has a bound rate, will soon be revised to 15 yen per kilogram, or 1.9 cents per pound. Rate for "above acid No. 2."

Compiled from official and other reports.

appreciably affect U.S. soybean sales to Japan since soybeans will be under Automatic Approval.<sup>2</sup> (U.S. soybeans can then be bought without quota controls.)

The abrupt termination in trade relations between Japan and Mainland China occurred in the spring of 1958 and resulted in an abandonment of the "Japan-Red China Private Trade Agreement." However, Chinese soybeans were imported until October 1958. Since that time, only insignificant quantities have arrived in Japan, and many of these came in

<sup>2</sup> Under the General Agreement on Tariffs and Trade Negotiations in 1961 at Geneva, Switzerland, soybeans were bound at 13 percent.

under false certificates of origin by transshipment. There are some indications that the soybean trade between the two countries will be resumed. This trade would possibly have some effect on the continued expansion of imports of U.S. soybeans into Japan, but would probably strengthen the U.S. position elsewhere in the world.

The soybeans imported into Japan from all areas require licenses, but the three systems used could be very different in their effect on trade. The Automatic Approval (AA) system provides for the licensing of soybeans on application with no value limit. Authorized exchange banks carry out this program and issue licenses to the extent of the exchange allocated for the AA system. The Foreign Exchange Fund Allocation (FA) system restricts the imports of soybeans far more severely; the amount of imports to be allowed is restricted and so is the source of the soybeans. Foreign exchange funds are allocated after examination of each individual application. The third system, Automatic Fund Allocation, the Global System, comes within the scope of the FA system and provides for allocations for soybeans without regard to the possible source of imports. The source of imports is determined by the price, quality, delivery time, and other factors that are taken into account before licenses are issued.

In recent months the Japanese Government has shifted imports of copra, olive oil, lard, tallow and grease, and other oilseeds, materials, and fats and oils to the AA system.

Japan buys soybeans from Brazil when they are available under a bilateral trade agreement and is the only outlet for Brazilian soybeans. Soybeans are a commodity that the Japanese can purchase to encourage Brazil to take more Japanese manufactured goods.

Japan has other bilateral trade agreements on fats and oils, oilseeds, and oil-bearing materials. Imports from these countries are brought in without control. These agreements include New Zealand and Australia, beef tallow; Morocco and France and French territories, soybean oil exports; Argentina, vegetable oil; Ceylon, oilseeds and copra; Korea, marine products; United Arab Republic, flaxseed and cottonseed; Poland, lard; Thailand, sesameseed, peanuts, castorbeans, and oilseeds; Belgium, oils and fats; Cambodia, sesame and cottonseed; and Rhodesia and Nyassaland, cottonseed and soybeans.

One of the vital problems concerning import policy on raw materials facing the Japanese oilseed-crushing industry is the importation of relatively low priced oilseed meals, as approved by the Livestock Bureau of the Ministry of Agriculture and Forestry. The crushers' association (Oil and Fat Manufacturers' Association) naturally is opposed to this action since it means that its members will lose the business as well as the opportunity to crush the oilseeds, and so maintain the operations of their mills, which are now operated at a relatively low capacity level. Nevertheless, the Livestock Bureau and feeding organizations have been able to show that there is a shortage of meal and high protein feeding supplies in Japan. If a large volume of low-priced meals is imported, the price of vegetable oils might be adjusted upward to compensate for some loss in total income received when domestically produced meals are placed on a competitive basis with imported meals. This, in turn, may have a considerable bearish and undesirable influence upon the present upward trends in vegetable oil consumption.

## DEMAND AND PRICE

The demand for fats and oils in Japan is increasing each year but, since the cost-price structure of fats and oils in Japan is high, the increase in demand is restricted. Gross margins, of course, reflect to some extent the high structure of domestic prices. Cost of raw materials and oilseed is high, and reflects the high cost and some inefficiencies of the small-scale domestic production, world prices of oilseeds and oil-bearing materials plus ocean freight, and a 13 percent tariff in case of soybeans. Furthermore, processing costs for oilseeds are high compared with those in most plants in the United States.

While high prices have depressed the demand for fats and oils in the past, present indications are that liberalization of soybeans may reduce prices of fats and oils and result in a 10 - 15 percent increase in demand. However, the price of vegetable oils will depend upon total returns crushers receive for cake and meal in the multiple product uses. Because a large percentage of the raw materials crushed are imported, the industry also has the high cost of maintaining a constant supply of imported oilseeds in stock, but the total supply in the past has never been large enough to employ a large percentage of capacity. Prices of finished fats and oils are high because the crushing and refining factories are burdened with these and other high costs. The factors of production involved--labor, for example--traditionally have been used for materials handling in many ways that have resulted in high total labor cost, even if unit labor costs are low. Modernization can thus provide a means of lowering consumer prices for fats and oils.

Under a free market for soybean imports, total volume of oilseeds crushed and total income from crushing and refining operations, no doubt, will be greater, but unit price and unit profit obviously could be somewhat less. Furthermore, lower prices provide the best means whereby government objectives for increasing the consumption of edible fats and oils could be attained. With the present high price structure, maximum consumption is not possible, and much of the present population is restricted to using low priced animal and marine fats for edible use.

Nevertheless, the demand for salad oil is increasing rapidly in Japan as a result of the Westernization of diets. Retail distribution of edible vegetable oils is improving as are promotional sales programs. With the development of economical disposable consumer packaging in Japan, the practice of carrying empty bottles or used oil cans or other containers to market, as is now practiced by the majority of vegetable oil consumers, will be done away with. This should increase the demand for vegetable oils by enabling the Japanese shopper to purchase vegetable oil as conveniently as other food items.

There has been some indication that retailers would push sales of vegetable oils if the retail margins were increased. However, as consumer demand grows, present margins should be satisfactory.

Improvement in merchandising methods for vegetable oils is needed. For example, besides improved packaging, it is thought that better displays, improvement in customer services, installation of improved measuring machines, and control of adulteration would improve the demand for vegetable oils. No doubt these are important, but the most important factors that will influence the demand for all vegetable oils are the upward trend in consumer income and lower price levels. It is evident from the large percentage of bulk sales that the Japanese consumer is very conscious of prices as well as quality. Sales promotional campaigns have tended to bring quality to the forefront, but the importance of price is evident as two-thirds of total sales are bulk volume. At the present time the margin between the price of packaged and bulk vegetable oils appears to be wide.

Quality control by processors or government in the retailing of vegetable oil will probably alleviate many problems, and also increase consumer demand by preventing adulteration and building up consumer preference and confidence.

The demand for edible hardened fats in Japan is growing, and it is expected that, with the increase in demand for these fats, there will also be an increase in the demand for quality fats. The demand for margarine can be expected to increase further, and the marketing and consumption of quality margarine processed from edible vegetable oils are expected to continue upward with this demand. However, under the present price systems, quality products are at a great disadvantage. Moreover, the production of quality margarine to meet Western standards may not meet the sensitive taste patterns of the mass of the Japanese people. The bad reputation that Japanese margarine has earned has been because of the use of low-grade or improperly refined marine and animal fats. This situation has held down demand for this product. Marketing quality products will disprove the fact that margarine tastes and smells bad, and the industry can increase significantly the demand for this product, if the retail price can be brought more in line with that of the



present product. With modern technical improvements and equipment available in the industry, there is no reason why the marketing of quality soybean and cottonseed margarine should not continue to expand. The margarine now produced in Japan contains about 75 percent animal and marine fats and oils. In addition, some 5,000 tons of confectioner's fat of the coconut oil type is manufactured for the baking industry.

The total demand for tallow and grease can be expected to continue to increase, but some leveling off is to be expected. The demand for caked laundry soap appears to be decreasing in Japan, as the country is starting to switch over to powdered soap and synthetic detergents. Caked laundry soap demands are expected to decrease from 203,000 metric tons for caked soap in 1960 to around 130,000 tons in 1964. On the other hand, powdered soap production is expected to increase from 99,000 metric tons in 1959 to 150,000 tons in 1964. The most rapid increase is seen in synthetic cleansers as production expands to 240,000 tons in 1964 from around 48,000 tons in 1959. These trends were estimated by the Japanese Ministry of International Trade and Industry.

The sharp declines in recent years in the world price of tallow have had an important influence on the consumption of whale oil in Japan. Whale oil, prior to about 1948, was used for soap making, but since that time it has been replaced by the more adaptable tallow. The domestic market for whale oil is now mainly for the hydrogenated oil by the margarine and shortening manufacturers. But the increase in the production of whale oil has been so large that these producers can utilize only part of the available supply. As a result the bulk of the supply now moves to Western European margarine manufacturers.

Demand for U.S. soybeans for use in food products manufacturing is increasing as a result of soybean food research and better industry studies in the United States and Japan. Japanese processors of tofu, shoyu, miso, and natto are beginning to prefer U.S. soybean varieties. According to the recent findings of the Japanese Agriculture-Forestry-Fishery Problems Investigating Committee, tofu makers are now using imported U.S. "Hawkeye" variety soybeans, and miso makers are shifting their preference to the imported U.S. "Harosoy" variety. These improved U.S. soybean varieties have been found to be more suitable for food-making purposes than older imported varieties. Also the "Jackson" and "Lee" varieties, imported from the southern areas of the United States, have been found to be suitable for making food products peculiar to Japanese taste.

Regular imports of these varieties of U.S. soybeans have been made by one large Japanese food firm since December 1959. The soybeans are carefully cleaned before leaving local terminal points in the United States and are guaranteed to be free from foreign material, including morning glory seed, and ready to use. Despite a premium charge of 10 to 15 percent on No. 2 yellow soybeans, the price in Japan is still considerably lower than the support price for domestic soybeans. Cost would be \$11.00 per ton more if cleaned in Japan, compared with \$2.90 for cleaning in the United States. But the cost to the miso manufacturer in November 1960 was about \$136.16 for a metric ton of variety preserved Harosoy beans from the United States compared with \$119.44 for a ton of ordinary No. 2 yellow U.S. soybeans. However, Hokkaido soybeans were available at \$166.67 per ton in the Tokyo area. A regular shipment of from 2,000 to 2,500 tons of these clean variety beans for direct food use is now arriving in Yokohama every month.

### Price Supports

Domestic soybeans, although lower in quality (90 percent of the commercial soybeans are very small) than imported beans, enjoy a support price to farmers of around 52,100 yen--\$145.00 per ton or \$3.95 per bushel. Approximately half of the domestic crop is used in the areas where the beans are produced and the remainder is sold to the agents of the Food Agency.

Under the government's price stabilization program for the domestic soybean crop, the quasi-government cooperatives are virtually exclusive purchasers of soybeans other



TABLE 23.--Soybeans: Average monthly wholesale price, domestic and imported, Japan, 1956-60<sup>1</sup>

Month and origin	1956	1957	1958	1959	1960
<b>DOMESTIC<sup>2</sup></b>	<i>Dollars per bushel</i>	<i>Dollars per bushel</i>	<i>Dollars per bushel</i>	<i>Dollars per bushel</i>	<i>Dollars per bushel</i>
January.....	3.90	4.45	4.13	4.74	4.40
February.....	4.02	4.38	4.21	4.76	4.35
March.....	4.14	4.35	4.15	4.76	4.30
April.....	4.32	4.50	4.19	4.83	4.04
May.....	4.58	4.42	4.57	4.77	4.03
June.....	4.41	4.34	4.88	4.80	4.23
July.....	4.44	4.38	5.32	4.81	4.15
August.....	4.54	4.39	5.94	4.55	3.87
September.....	4.82	4.56	6.26	4.31	3.91
October.....	4.69	4.88	6.29	4.46	3.91
November.....	4.64	4.40	4.76	4.33	3.91
December.....	4.39	4.08	4.45	4.44	---
Year average (Jan.-Nov.).....	4.41	4.43	4.93	4.63	4.10
<b>IMPORTED<sup>3</sup></b>					
January.....	3.29	4.00	3.76	3.95	3.70
February.....	3.36	3.96	3.87	3.98	3.70
March.....	3.54	3.83	3.96	3.98	3.58
April.....	4.03	3.92	3.83	4.05	3.59
May.....	4.59	3.92	4.14	4.01	3.50
June.....	4.36	3.83	4.25	3.92	3.52
July.....	4.22	3.88	4.23	3.92	3.46
August.....	4.04	4.01	4.30	3.82	3.46
September.....	4.01	3.95	3.82	3.58	3.49
October.....	3.90	3.98	3.95	3.74	3.35
November.....	3.91	3.88	4.12	3.94	3.42
December.....	4.02	3.81	3.95	4.13	---
Year average (Jan.-Nov.).....	3.94	3.91	4.01	3.92	3.52

<sup>1</sup> Converted at rate of 360 yen per U.S. dollar. <sup>2</sup> Wholesale prices in Tokyo, Tofu Mfrs., reported by the Bank of Japan. <sup>3</sup> January 1956 through August 1958 - wholesale prices in Tokyo, reported by the Bank of Japan; starting September 1958 - wholesale prices on rail tariff paid, bagged 60 kilos, Yokohama, reported by the Tokyo Pulse and Miscellaneous Grains Wholesalers Association, U.S. No. 2 yellow grade to oil crushers.

Ministry of Agriculture and Forestry.

TABLE 24.--Soybean and rapeseed oil: Average monthly wholesale price, Tokyo, 1956-60<sup>1</sup>

Month	Rapeseed oil <sup>2</sup>					Soybean oil <sup>2</sup>				
	1956	1957	1958	1959	1960	1956	1957	1958	1959	1960
	<i>Cents per pound</i>	<i>Cents per pound</i>	<i>Cents per pound</i>	<i>Cents per pound</i>	<i>Cents per pound</i>	<i>Cents per pound</i>	<i>Cents per pound</i>	<i>Cents per pound</i>	<i>Cents per pound</i>	<i>Cents per pound</i>
January.....	22.40	19.34	18.30	19.47	22.91	22.01	20.87	19.85	20.24	23.29
February.....	22.27	19.19	19.30	19.47	22.27	22.01	20.49	20.24	20.24	22.78
March.....	21.38	19.04	19.30	19.60	21.76	21.38	20.11	20.37	20.24	22.14
April.....	21.38	18.86	18.46	20.62	21.00	21.76	19.85	19.47	20.87	21.51
May.....	21.89	18.86	18.33	20.62	19.47	22.66	19.85	19.47	20.87	20.75
June.....	21.51	18.58	17.94	19.03	18.78	22.53	19.47	19.34	20.49	19.98
July.....	20.95	18.43	17.31	19.90	19.87	22.01	19.72	19.09	20.66	20.36
August.....	19.85	17.92	17.18	21.13	20.24	21.25	19.98	19.09	21.76	20.62
September.....	19.85	17.72	17.74	22.20	20.24	21.00	19.85	19.34	22.40	20.62
October.....	19.09	17.72	18.33	22.53	19.85	20.62	19.85	19.60	22.53	20.24
November.....	18.84	17.46	19.34	22.78	19.85	20.37	19.70	20.11	22.91	20.24
December.....	19.85	17.97	19.47	22.91	<sup>3</sup> 19.85	21.00	19.70	20.24	23.29	<sup>3</sup> 20.24
Year average..	20.77	18.42	18.41	19.19	20.51	21.56	19.95	19.68	21.38	21.06

<sup>1</sup> Converted from yen at rate 360 yen per U.S. dollar.

<sup>2</sup> Deodorized, refined oil, packed in 16.5-kilogram (36.4 pounds; approximately 5 gallons) metal containers.

<sup>3</sup> Preliminary.

Bank of Japan and Ministry of Agriculture and Forestry.

TABLE 25.--Soybean cake and meal: Average monthly wholesale price, Japan, April 1959-December 1960<sup>1</sup>

Month	1959	1960
	<i>Dollars per metric ton</i>	<i>Dollars per metric ton</i>
April.....	108.22	111.85
May.....	106.07	117.93
June.....	103.56	117.78
July.....	99.48	116.15
August.....	99.11	113.70
September.....	97.04	110.22
October.....	95.93	112.44
November.....	96.22	121.85
December.....	96.89	115.04
January.....	--	98.37
February.....	--	98.89
March.....	--	100.00

<sup>1</sup> Converted from price in yen for 37.5-kilogram bag at rate of 360 yen per U.S. dollar.

Ministry of Agriculture and Forestry.

TABLE 26.--Rapeseed: Farmers' average monthly selling price, Japan, 1958-60<sup>1</sup>

Month	1958	1959	1960
	<i>Dollars per bushel</i>	<i>Dollars per bushel</i>	<i>Dollars per bushel</i>
January.....	3.89	3.93	4.86
February.....	4.12	3.98	4.83
March.....	4.09	4.00	4.75
April.....	3.89	4.12	4.65
May.....	3.86	4.14	4.50
June.....	3.69	3.92	3.93
July.....	3.64	4.09	4.20
August.....	3.61	4.60	--
September.....	3.64	4.73	--
October.....	3.70	4.77	--
November.....	3.83	4.77	--
December.....	3.92	4.83	--
Average.....	3.82	4.32	Jan-July 4.53

<sup>1</sup> Converted from yen at rate of 360 yen per U.S. dollar.

Ministry of Agriculture and Forestry.

than the soybeans purchased by users in the areas of production. Deliveries to the cooperative purchasing agents are high, and the favorable prices induce most farmers to sell the bulk of their production to these agents. Moreover, farmers' deliveries are not compulsory in the usual sense of that term. But the processors of soybeans are required by the government to purchase domestic soybeans at fixed prices substantially above the prices of imported soybeans. The support prices of soybeans showed a slight decline in 1960 and were maintained at around 3,120 yen per 60 kilogram bag, \$3.93 per bushel.

The price stabilization program for rapeseed is provided for under the Food Control Special Account. The Government of Japan sets the price level annually on the basis of the supply and demand situation in prospect; this basis is the same as that used for soybean price support. Producer associations are asked to maintain the price level by voluntary control of sales. The government has stepped in to support the price of rapeseed with purchases only when the associations failed in their efforts to do so. Rapeseed sales are made to the crushing mills on the basis of bidding.

Domestic price support programs for soybeans and rapeseed have recently been bolstered by the fact that the government has earmarked 3 billion yen (\$8,333,333) for

support of domestic producer prices in 1961. This program, however, has not as yet been approved by the Japanese Diet. This program, nevertheless, has been said to be necessary because of the anticipated continuation of imports of cheaper soybeans, particularly since imports are freed. The government plans to take special legal and administrative measures, and will refrain from direct purchase of these products. It will probably authorize the buying and reselling to cooperatives. The funds made available are to cover the price spread between the prices of domestic and imported products. Under this special income-support program for both domestic soybeans and rapeseed, the farmer cooperatives will buy these oilseeds at set prices and resell them on the domestic market at a specified lower price. If the cooperatives are able to sell oilseeds at prices above the minimum resale price, their purchase quota, previously set, will be raised proportionately.

Soybeans and soybean meal are imported and sold by the Japanese Ministry of Agriculture and Forestry for the specific reason of stabilizing the price by bringing supply more in line with the demand. The government appoints the firms to do the importing and they execute the business on the part of the government by selling to such agricultural organizations as the Central Feed Wholesalers Association and the Hokkaido Feed Association.

When soybeans are imported solely for feed, these associations turn them over to the oilseed crushing mills which crush them on commission. The mills then turn the soybean meal over to the unit cooperative associations which sell it directly to the livestock and poultry farmers. The soybean oil is refined by the crushing mills, which purchase it and include their crushing commission as part of the price. This system of course will be more difficult to operate now that soybeans are on the Automatic Approval list of imports, but since the import duties are often waived the government will still be the controlling force in establishing the market prices for oilseed meals.

## CONSUMPTION

Japan's consumption of fats and oils and soybeans and oilseed cakes and meals is rising each year, and the demand for these commodities is expected to continue upward during 1961.

The total consumption of fats and oils in Japan in 1961 is expected to be 5 to 10 percent above the record levels of 1960. Record imports of oilseeds, oil-bearing materials, and vegetable oils and animal fats were forecast for fiscal years 1960 and 1961 (beginning April 1). More fats and oils and oilseeds imports will be provided for Japanese food and industrial needs in line with the continued upward trend in consumption.

Total consumption of edible fats and oils during 1961 is expected to reach 469,000 metric tons, nearly 10 percent over the 431,000 tons consumed in 1960 and 20 percent above that of 392,800 tons in 1959. Fiscal year 1961-62 consumption should reach 472,500 tons. Industrial uses of fats and oils are forecast at 379,500 tons in the calendar year 1961 compared with 352,500 in 1960 and only 295,800 tons in 1958 (table 3).

As consumption of fats and oils and soybeans continues to increase with the steady increase in population and changing food habits, the limited resources available for expanding domestic oilseed crops become more inadequate for Japan's needs. Japan has been obliged to obtain a larger share of its fats and oils supplies from marine and overseas sources. Moreover, Japan will probably continue, provided the Japanese-Mainland China trade remains closed, to purchase U.S. soybeans in larger quantities each year.

Per capita consumption of both edible and industrial fats and oils has increased significantly in recent years in Japan; and continued upward trends are expected in 1961 as total consumption increases more than is necessary to take care of population growth.

Total per capita consumption in 1961 is expected to reach 19.7 pounds compared with 18.5 pounds in 1960, 17.3 pounds in 1959, and 14.9 pounds in 1958. Consumption of edible



TABLE 27.--Fats and oils: Estimated per capita consumption in Japan, average 1936-39, annual 1951-61

Year	Shortening and margarine	Edible <sup>1</sup>	Inedible	Total
Average: 1936-39.....	Pounds ---	Pounds 2.5	Pounds 7.2	Pounds 9.7
Annual:				
1951.....	.6	3.6	4.0	7.6
1952.....	.8	4.0	4.1	8.1
1953.....	1.0	4.5	5.2	9.7
1954.....	1.5	4.8	5.1	9.9
1955.....	1.6	6.4	6.4	12.8
1956.....	1.5	7.0	6.3	13.3
1957.....	1.7	7.1	7.5	14.6
1958.....	1.8	7.9	7.1	15.0
1959.....	1.9	9.3	8.3	17.6
1960.....	2.1	10.2	8.3	18.5
1961 (est.).....	2.3	10.9	8.8	19.7

<sup>1</sup> Crude oil basis, since a large percentage of crude oil is consumed as such. Adjustment for total edible use as refined oil would reduce consumption about 1/2 pound per capita in recent years.

fats and oils during 1961 probably will reach nearly 10.9 pounds compared with 10.2 pounds and 9.3 pounds in 1960 and 1959, respectively. Furthermore, while this rate of edible fats and oils use is small compared with the U.S. rate of around 45 pounds, the consumption of whole soybeans and soybean meal in food production in Japan is large and expanding, and from these soybean foods an additional 2.5 pounds of edible oil equivalent is added to the Japanese diet. Consumption of fats and oils by industry probably reached 8.3 pounds last year, about the same as in 1959 and 1.2 pounds higher than in 1958. This rate of consumption may be compared with around 25 pounds per capita in the United States.

Total consumption of edible and inedible fats and oils in Japan is now more than double that of the prewar period, 1936-39. Moreover, consumption of edible fats and oils is now more than four times the prewar usage, but inedible consumption is not yet double the prewar levels.

Japan experienced a severe shortage of fats and oils in 1946 and the postwar year of 1947. In fact, consumption of edible fats and oils did not reach the prewar level until 1950. For inedibles, it was not until after 1954 that prewar levels of consumption were reached. Moreover, edible fats and oils which accounted for only 25 percent to 30 percent of total consumption in the prewar and war periods now make up over half of the total.

Consumption of fats and oils has been moving upward in line with the increase in the standard of living. The government has projected the consumption rate for edible fats and oils at about 20-22 grams per day per person. The consumption of soybean products has been increasing also and is expected to reach 40 grams per day by 1965, although there is some indication that the per capita consumption of miso and soybeans used directly in food will be leveling off.

Consumption of fats and oils in the rural areas of Japan is particularly low, and one of the important factors behind the government program of pushing oilseeds production is to increase the consumption of these products in the farm areas. For example, the visible consumption of fats and oils in Hokkaido in northern Japan falls somewhat below consumption of the other areas, and total consumption is estimated at below 3 grams per day, or an annual visible consumption of vegetable oils and fats around 3 to 4 pounds. Total fat consumption including farm fats and oils, however, would probably place this consumption rate at a higher level, but still not equal to that in other areas.

About 50 percent of the consumption in Hokkaido is supplied by local production; the remainder of commercial fats and oils is imported from other areas of Japan. During recent years the refining of rice-bran oil in Hokkaido has diverted oil from inedible channels of soap making to edible channels, for use as a tempura or cooking oil.



Over 640,000 tons of oilseeds were consumed directly as food or in food production in 1960. Soybeans, peanuts, and sesameseed are the important oilseeds used (table 12).

Soybeans are an important source of nutrition for the Japanese people, and studies are being made to find new ways to use them in food. In 1961 over 550,000 tons of soybeans will be consumed by these industries. Consumption of soybean cake and meal for food use is expected to be nearly 400,000 tons in 1961.

Per capita consumption of margarine in 1960 was about three times the 1951 level. The increase has been steady even with the development and climb in the consumption of shortening. Consumption of margarine for household use and baking has maintained the upward trend, and shortening consumption is now equal to margarine consumption.

The consumption of edible hydrogenated fats and oils, shortening, and margarine is correlated with the consumption of bread and baking products in Japan, since fats and oils are an essential ingredient in these products. On the other hand, the per capita consumption of wheat (including bread) is related also to the supply of rice. Shifts in income have had very little effect on rice and bread consumption. As the bountiful 1960 crop of rice is consumed in 1961, there may be some reduction in the consumption of wheat and wheat products. And as a result, the consumption of bakery margarine and shortening may slow up in 1961. Nevertheless the increase in home consumption of margarine and shortening for direct cooking use is expected to continue upward. While total wheat consumption is expected to increase, per capita consumption is forecast to decline as consumption of animal foods increases in the next 10 years.<sup>3</sup> Also, rice consumption is expected to remain high, and total consumption of margarine and shortening is expected to climb, as consumption of these products is also related to the increase in the use of livestock products.

Consumption of oilseed cake and meals in livestock feeds has been increasing rapidly in the past few years, and consumption is expected to continue upward (table 4).

## MARKETING AND MARKET DEVELOPMENT

### Marketing Vegetable Oils

In Japan the bulk of the edible fats and oils are consumed as refined, bleached, and deodorized liquid oils, and the demand for liquid soybean, rapeseed, and other vegetable oils for tempura, frying, cooking, and salad is expanding. In fact, the demand for liquid oils has resulted in the integration of the oilseed crushing and refining industries. If the demand for hydrogenated or hardened edible oils had been as large as for vegetable oils, the industry probably would have grown up around shortening and margarine much as in the United States.

The integration of marketing and processing vegetable oils in Japan has encouraged the marketing of the products on the strength of a brand name. Institutional advertising is playing an increasingly important role in marketing and purchasing, and every major processor has his own mark or symbol and brand name. Competition is therefore much the same as in the marketing of vegetable cooking oils, margarine, and shortening in the United States, and will probably continue to increase in the future.

While not a factor in bulk sales, advertising is important in marketing packaged vegetable oils, and a high degree of product designation by consumers is found. In fact, in the large cities 95 percent of the time, consumers purchase packaged vegetable oils by designating a particular brand.<sup>4</sup> Those companies that have the large share of the market are those that are able to popularize their brand name through massive advertising and to maintain wholesale and distribution systems, although margins allowed retailers are only

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<sup>3</sup> Takemi Yasunaga, "A Study on Consumption and Forecast of Selected Agricultural Products in Japan," September 1960, Economic Research Institute.

<sup>4</sup> Report of Japanese-American Soybean Institute on edible oil sales by retail stores, issued July 1959.

a small factor in oil sales. Other vegetable oils brands appear to command only nominal sales, but are still competing by reducing their margins. While these less-popular brands may be equally as high in quality, they are less familiar to the consumer.

Integration of the refining and crushing industry also gives the oil companies some control over the quality of product they market. Japanese consumers have become conscious of vegetable oils' nutritional qualities and are demanding quality products. The technology of the industry is now geared to producing superior quality oils to supply these demands at competitive prices.

However, a basic problem is to expand consumer demand for vegetable oils. Hotels and restaurants in the cities use large quantities of these oils and shortenings for cooking, salad dressing, and deep frying, but their use in the home is still somewhat limited, particularly in rural homes.

Lower priced packaging would help promote sales; consumers of bulk oils purchase on the basis of price, which is not a very important factor in packaged oils. However quality is still important in bulk oil sales, and this is something consumers do not always get. Sometimes high-quality and inferior oils are mixed, which means the consumer gets a poor quality oil that has not been fully deodorized.

Over two-thirds of total vegetable oil sales are in bulk in consumer-supplied containers. And over two-thirds of the consumers buy it this way because of the lower price. Besides quality, bulk sales have other disadvantages. The customers are not aware of the brand they are purchasing. The merchant must handle a large number of big containers--4.7 gallons (1 to). It is expected that this method of sale will continue to decline as consumer incomes rise and consumers become more brand conscious.

Bulk oil sales are made on the basis of 1 go (1 go equals one-third pint, or 0.048 gallon) or by deciliter. Most consumers buy 3 gos or less because retailers sell it on the basis of 3 gos for 100 yen (about 28 cents).

The trend to consumer packages away from bulk oil sales appears to be increasing. The industry has installed, at many plants, specialized production lines for filling consumer-size packages. Marketing studies have shown that 800-gram and 1,400-gram cans of tempura oil are the most popular types of package sold. The 800-gram can makes up over half of the sales, and the 1,400-gram can, almost 30 percent. For salad oil, the most common package is the 250-gram bottle; over a third of the packaged salad oil sales are made in this container. Only a small percentage of sales is made in smaller bottles.

During Christmas and New Year festivities, special consumer packages are available featuring salad and cooking and tempura oils as gifts. This type of packaging is becoming popular in Japan, and may lead to increased purchases of consumer-size packages. At the present, however, only a small volume of oil is moved in this type of packaging.

In the Tokyo market, specialized production of vegetable oils is an important factor for packaged vegetable oils. Several oil companies that have specialized in salad oil have led the way in developing and expanding this market. One major company's salad oil has the major share of this market, while another company has a large share of the tempura sales. Sesame oils are also special products of a few oil mills, and they sell well in the Tokyo area.<sup>6</sup> The few mills that specialize in producing salad oil generally also market a larger percentage of their oils as tempura because of the availability of packaging facilities. Tokyo stores handle about half tempura oil, one-third salad oil, and about one-sixth sesame oil. Retailers in the Tokyo area generally handle those company brands of packaged oil that have a high ratio of consumer designation. In Tokyo and elsewhere in Japan, edible vegetable oils are marketed through retail grocery stores, wine shops, special vegetable oil retail stores, and sometimes through vegetable and fruit shops.

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<sup>6</sup> Ibid.

For tempura oil, a blend of half soybean oil and half rapeseed oil has had good consumer acceptance. Some cottonseed oil is often blended with these oils, but this depends on the mill and the season. Cottonseed oil is used interchangeably with soybean oil at many mills. Both refined cottonseed oil and soybean oil are also sold for use in packaging fish.

In salad oil the percentage of rapeseed oil often is increased; some mills use only 20 percent soybean oil and 80 percent rapeseed oil for this purpose. Salad oil is manufactured by the few large mills that have winterizing facilities. The market for this oil is growing, and it has been estimated that its use will increase 50 percent in the near future. Now, salad oil is only a small percentage of the total vegetable oil marketings. It has been estimated that, in the larger areas, it represents only about one-third of the total packaged oils.

For cooking oils, both rapeseed oil and soybean oil are marketed separately as refined oils. The percentage of oil that is marketed for tempura oil, cooking oil, and salad oil varies considerably. For example, the percentage marketed at 10 of the large mills for each type of oil varied as follows:

	<u>Percent</u>
Tempura.....	30 - 80
Cooking oil.....	10 - 20
Salad oil.....	10 - 60

Margarine for household use is packaged in one-half-pound cartons containing two sticks of one-quarter-pound each which are wrapped in foil or parchment. Modern packaging machines are used on the production lines. Margarine in 8-gram pieces, wrapped in parchment, is served once or twice a week in the nation's school lunch program. Commercial sales are in either 33-pound cans or in wooden boxes.

## Marketing Oilseeds

### Storage

Storage is not a problem with most of the vegetable oil mills, but most of the space available at the larger mills is flat storage for bagged oilseeds. Only about one-fourth of the large mills have bulk storage facilities and handling equipment. Most oilseeds received at the mills are sacked at the docks and transferred to the mills' storage houses either by truck or rail carts--a costly method. Recently, however, several more mills have constructed modern silo-type storage facilities for receiving bulk oilseeds, and others are building them. These will be modern in every respect, some having facilities to move soybeans and other oilseeds by pneumatic conveyors.

Storage and processing operations are often complicated by the fact that domestic soybeans lack uniformity in quality; in fact, in some areas each bag has different quality and moisture content. On the other hand, American soybeans are superior and are highly uniform in both of these qualities. Brazilian soybeans still include beans of many off colors, and food products made from them lack taste quality.

### Inspection

Surveyors of the Japan Oilstuff Inspectors Corporation (Nippon Yugyo Kentei Kyokai), licensed by the Japanese Government, have been doing inspection tests on U.S. soybeans and other oilseeds for many years. After working with officials of the U.S. Department of Agriculture sent to Japan for the purpose of standardizing inspection techniques, these surveyors have been able to do this work in accordance with USDA's Official Grain Standards. The results of the inspections, carried on by authorization from the Japanese-American Soybean Institute under the guidance of the American Soybean



Association, have indicated that the quality of soybean imports from the United States has improved materially in recent years. This type of marketing service abroad has greatly helped American farmers and exporters provide better quality soybeans for export markets.

### Soybeans

Grading.--Domestic soybeans in Japan are sold on the basis of size: Large, medium, small, and very small. Large soybeans must pass through a screen with a minimum of 7.88 mm., and 70 percent of the beans must be of this size; medium-size soybeans must pass through a screen of 6.67 mm.; the small size, through a screen of 5.45 mm. or more; and for the very small size the minimum size of screen through which 70 percent of the soybeans must pass is 4.85 mm. All other soybeans are graded as sample grade.

Standards for farmers' soybeans differ only slightly from those of the industry. Standards for the different size of producers' soybeans are as follows:

#### LARGE SOYBEANS

Class	Whole or perfect kernels	Moisture	Damaged kernels	Foreign material
	<u>Minimum</u> <u>percent</u>	<u>Maximum</u> <u>percent</u>	<u>Maximum</u> <u>percent</u>	<u>Maximum</u> <u>percent</u>
1	95	14	5	0
2	90	14	10	0
3	85	14	14	1
4	75	16	23	2
5	65	16	32	3

#### MEDIUM, SMALL, AND VERY SMALL SOYBEANS

1	90	14	10	0
2	85	14	15	0
3	80	14	19	1
4	70	16	28	2
5	60	16	37	3

#### SAMPLE GRADE (ALL OTHER SOYBEANS)

Soybean price supports range from yen 3,160 to 3,300 a bale of 60 kilograms (or \$3.91 - \$3.98 per bushel) based on the variation in these grades.

Moving Imported Beans.--Soybeans and other oilseeds are imported by large importing firms that have branch offices in New York and other American cities. Most of these firms have their Japanese headquarters in Tokyo with branch offices in other Japanese cities.

Soybeans arriving in Japan are continuously sampled for quality by both private and government inspectors. Most soybeans arriving by ship are transferred in bulk to lighters, and then moved either directly to the mills or to bagging operations at the wharf. Usually the beans are bagged, which increases the marketing cost, and then transferred by truck or small-plant-type rail cars to storage. Only five or six mills can transfer bulk oilseeds direct from lighters or ship by air suction or bucket belts and screw conveyors to storage.

Ocean Freight Rates.--The decline in tramp/shipping rates for shipping soybeans from U.S. gulf ports has been an important factor in decreasing landed costs to the Japanese importers. The average rate for shipping a metric ton of soybeans in 1959 was

\$8.30, and in 1960 it averaged around a dollar a ton higher. The 1959 rate averaged nearly one-third less than the 1951 and about half of the 1957 level.

## Rapeseed

Marketing and Storage.--A large percentage of the rapeseed crop is purchased by cooperatives and placed in their warehouses. The average price or final settlement price paid farmers at the end of the marketing season was 3,695 yen (\$4.62 per bushel) in 1959 for third grade in 60-kilo bags. The price in 1960 for the comparable grade was around 3,500 yen (\$4.38 per bushel).

Very little deterioration has been found in stored rapeseed since it is stored in bags and very little foreign materials is marketed with the seed. Farmers do not store rapeseed, but rely on Zenhanren (the major farm purchasing cooperative) to store it for them. This storage is a temporary measure, as the seed in most years generally moves to the oil crushers soon after harvest.

Oil crushers often buy rapeseed directly from farmers, and it has been said that these mills bid up the price of rapeseed. For the most part, however, they are generally the small local mills. Rapeseed meal has, in the past, been marketed for fertilizer use, but is starting to be demanded for livestock feed.

Grading.--Rapeseed is graded on the basis of oil content in Japan. Four grades have been established by the government; rapeseed not meeting the standards of these grades falls into the lowest of sample grade class. The third grade is the standard grade, and price differentials are made above and below this grade:

<u>Grade</u>	<u>Price in yen per 60-kilo bag</u>
1st	150 per bag higher than 3rd
2nd	50 per bag higher than 3rd
4th	75 per bag lower than 3rd
Sample	150 per bag lower than 3rd

The following factors establish the grade:

<u>Grade</u>	<u>Oil content</u>	<u>Foreign material</u>	<u>Moisture</u>
	<u>Percent</u>	<u>Percent</u>	<u>Percent</u>
1	41	0	9
2	39	1	9
3	38	2	10
4	36	3	12

## Market Development

In Japan, market development programs for U.S. soybeans are carried on through the Japanese-American Soybean Institute in Tokyo. This Institute is operated by the American Soybean Association of Hudson, Iowa, with assistance of funds provided by the U.S. Department of Agriculture from Section 104(a) of Public Law 480, and cooperators in Japan. Marketing program activities are aimed at increasing the demand for soybeans through education of Japanese buyers, importers, processors, and consumers regarding the merits of soybeans and soybean products. Among these activities have been studies by several U.S. trade and industry teams and technicians in Japan and by Japanese counterparts in the United States. Mobile shows, lectures, and cooking demonstrations conducted by the Food Life Improvement Association have been useful in educating consumers. Cooking classes featuring soybean products are also conducted by the Nutrition Improvement Popularization Institute for consumers. Cooking contests and consumer

education and nutrition studies have been made by the Japan Soy Sauce Brewers Association, Oil and Fat Manufacturers' Association, and Japan Tofu Association. Promotion of soybean flour has been undertaken by the Oil and Fat Manufacturers' Association and the Home Living Institute. Market development activities further provide a continuous check on the quality of American soybean imports to insure that we are maintaining the quality of soybeans desired. By working with the industry the American Soybean Association has aided directly in the increase of soybean exports to Japan. Japanese users are now fairly well satisfied with the improved quality and price of American soybeans; particularly are they satisfied with the reduction in foreign material and in the number of shipments containing large amounts of green soybeans and allegedly toxic morning glory seeds. Furthermore, through research and tests, variety-preserved shipments have been developed and made feasible through efforts sponsored by this market development work.

The All Japan Soap Association is cooperating with the National Renderers Association from the United States to develop and expand the Japanese market for U.S. tallow and grease. Publicity has been directed toward the Japanese consumer to promote soap consumption, the chief use of these commodities. Per capita consumption in the rural areas of Japan is particularly low and promotion is being extended into these areas.

Soap consumption is expected to increase with the advancement of the living standard of the Japanese people. Advertising media to popularize soap in Japan has taken the form of songs, motion pictures, slides, pamphlets, posters, school wall-paper, women's magazines, television, radio, newspaper, touring publicity car, and other means of advertising. Improvement of the quality of tallow and grease shipped to Japan has resulted from contact work with American tallow and grease manufacturers.

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